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NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS, TENNESSEE, --ETC(U)
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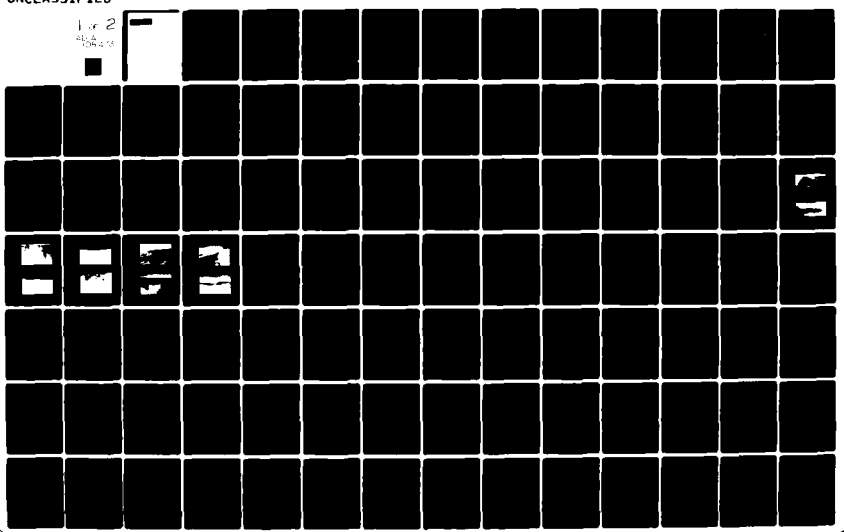

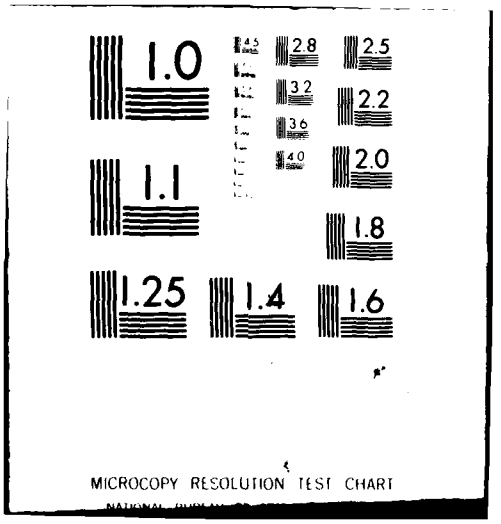
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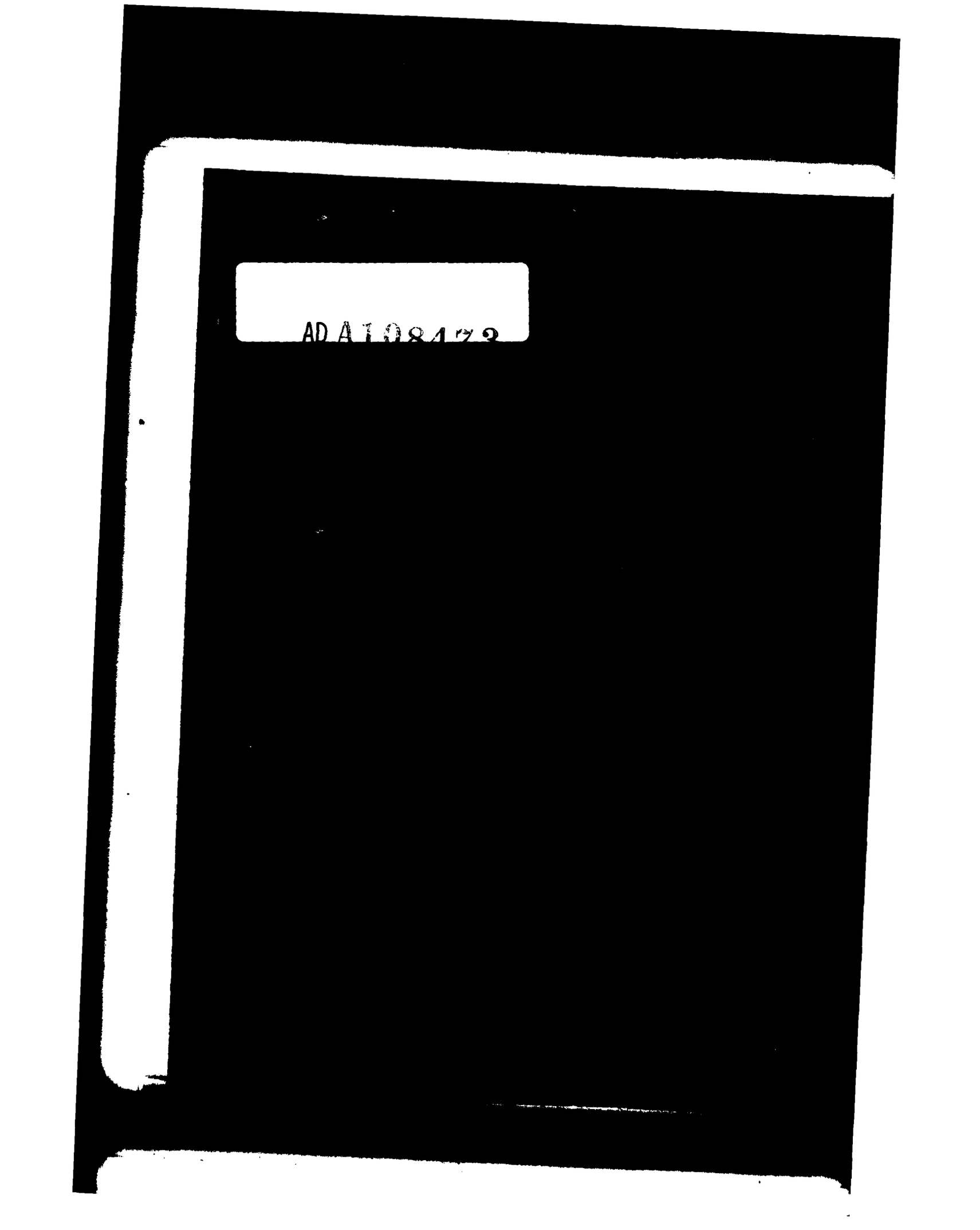

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REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A108 473
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle) National Program of Inspection of Non-Federal Dams, Tennessee. Grand Valley Dam No. 1 (Inventory Number 06924) near Hickory Valley, TN, Hardeman County, TN, Hatchie River Basin	5. TYPE OF REPORT & PERIOD COVERED Phase 1 Investigation Report
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)	8. CONTRACT OR GRANT NUMBER(s) DACW-62-81-C-0056
9. PERFORMING ORGANIZATION NAME AND ADDRESS Winsett, Simmonds, Consterdine & Associates, Inc. P.O. Box 40045 Nashville, TN 38104	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Engineer District, Nashville P.O. Box 1070 Nashville, TN 37202	12. REPORT DATE September, 1981
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Approved for public release; distribution unlimited

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18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dams
Dam Safety
National Dam Safety Program
Grand Valley Dam No. 1, TN
Hickory Valley, TN
Hardeman County, TN
Embankments
Visual Inspection
Structural Analysis

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Grand Valley Dam No. 1 is located in Hardeman County, Tennessee sevel miles east of Hickory Valley Tennessee and is an earth fill embankment 37 feet high and 1800 feet long. The crest width is 26 feet. Facilities for discharge from the reservoir are located near the south abutment and consist of a concrete service spillway 11 feet by 8 feet with two 9.0 foot by 0.83 feet openings and a 42 inch CM pipe barrel through the dam and an emergency spillway constructed as a low area in the top of the dam. The emergency spillway has gentle side slopes and a 50 foot wide bottom section. The entrance and exit slopes are

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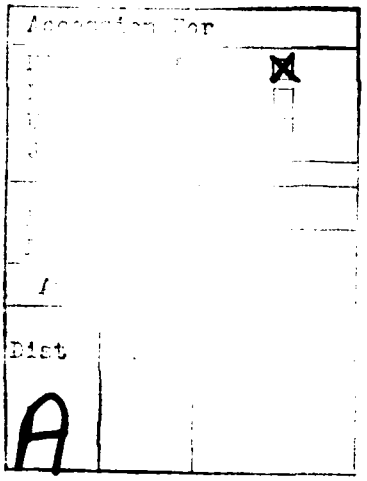
1V on 3H on the upstream slope and 1V on 4H on the downstream slope. No protection is provided for the exit slope. The upstream slope is vertical from the waterline for approximately two feet. The slope from that point to the crest is one vertical on three horizontal. The downstream slope is generally one vertical on four horizontal. Both the upstream and downstream slopes have ineffective vegetation. The dam is in the intermediate size category and has a downstream hazard potential classification of high by the USCE and "I" by the State of Tennessee. On the basis of hydraulic analysis, the dam has flood storage (572 acre-feet) and spillways inadequate to safely pass the Probable Maximum Flood (PMF) which the Office of the Chief of Engineers (O.C.E.) Guidelines specify to be the design flood for a dam in the intermediate size and high hazard categories. The dam is considered "Unsafe-Non-emergency". It is recommended that a qualified engineer be engaged to: Investigate seepage problems on the downstream slope and toe and recommend remedial measures; recommend methods to stop erosion on dam; investigate conditions of the service spillway outfall pipe and recommend remedial measures if necessary; investigate slippage failures and recommend remedial measures; develop a continuing investigation and maintenance program; develop an emergency action plan to alert downstream residents in the event a major problem develops with the dam. In addition, the owner should: Check seepage flows often to determine any changes in the quantity or color until engineers are engaged; and prevent the accelerated undercutting of the upstream slope by stopping water skiing close to the slope.



DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1070
NASHVILLE, TENNESSEE 37202

21 SEP 1981

IN REPLY REFER TO
ORNED-G

Honorable Lamar Alexander
Governor of Tennessee
Nashville, TN 37219

Dear Governor Alexander:

Furnished herewith is the Phase I Investigation Report on Grand Valley Dam No. 1 near Hickory Valley, Tennessee. The report was prepared under the authority and provisions of PL 92-367, the National Dam Inspection Act, dated 8 August 1972.

The report presents details of the field inspection, background information, technical analyses, findings, and recommendations for improving the condition of the dam.

Based upon the inspection and subsequent evaluation, Grand Valley Dam No. 1 is classified as unsafe-nonemergency due to insufficient storage and spillway capacity to pass the one-half probable maximum flood and questionable stability of the embankment due to seepage and erosion problems.

We do not consider this an emergency situation at this time, but the recommendation concerning project modifications to allow safe passage of the design flood and others contained in this report should be undertaken in the near future to minimize the risk to the mobile home subdivision located downstream.

Public release of the report and initiation of public statements fall within your prerogative. However, under provisions of the Freedom of Information Act, the Corps of Engineers is required to respond fully to inquiries on information contained in the report and to make it accessible for review on request.

Your assistance in keeping me informed of any further developments will be appreciated.

Sincerely,

Kenneth W. Ashley, LTC
FOR LEE W. TUCKER
Colonel, Corps of Engineers
Commander

1 Incl
As stated

CF:
Mr. Robert A. Hunt, Director
Division of Water Resources
4721 Trousdale Drive
Nashville, TN 37220

PHASE I INSPECTION

GRAND VALLEY DAM NO. 1

HARDEMAN COUNTY, TENNESSEE

Prepared By:

WINSETT-SIMMONDS, CONSTERDINE & ASSOCIATES, INC.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
TENNESSEE

Name of Dam	Grand Valley Dam No. 1
County	Hardeman
Stream	Gin Pond Branch
Date of Inspection	April 14, 1981

This investigation and evaluation report was prepared for the Tennessee Department of Conservation, Division of Water Resources by Winsett-Simmonds, Consterdine & Associates, Inc., P.O. Box 40045, Memphis, TN 38104.

Prepared By:

Wm. E. Bush, P.E., Director
Civil & Water Resources Engineering

ABSTRACT

Grand Valley Dam No. 1 is located in Hardeman County, Tennessee seven miles east of Hickory Valley, Tennessee, and is an earth fill embankment 37 feet high and 1800 feet long. The crest width is 26 feet. Facilities for discharge from the reservoir are located near the south abutment and consist of a concrete service spillway 11 feet by 8 feet with two 9.0 foot by 0.83 foot openings and a 42 inch CM pipe barrel through the dam and an emergency spillway constructed as a low area in the top of the dam. The emergency spillway has gentle side slopes and a 50 foot wide bottom section. The entrance and exit slopes are 1V on 3H on the upstream slope and 1V on 4H on the downstream slope. No protection is provided for the exit slope.

The upstream slope is vertical from the waterline for approximately two feet. The slope from that point to the crest is one vertical on three horizontal. The downstream slope is generally one vertical on four horizontal. Both the upstream and downstream slopes have ineffective vegetation.

Grand Valley Dam No. 1 is in the intermediate size category and has a downstream hazard potential classification of high by the USCE and "I" by the State of Tennessee.

On the basis of hydraulic analysis, Grand Valley Dam No. 1 has flood storage (572 acre-feet) and spillways inadequate to safely pass the Probable Maximum Flood (PMF) which the Office of the Chief of Engineers (O.C.E.) Guidelines specify to be the design flood for a dam in the intermediate size and high hazard categories.

At this time, the dam is considered "Unsafe-Nonemergency". It is recommended that a qualified engineer be engaged to: Investigate seepage problems on the downstream slope and toe and recommend remedial measures; recommend methods to stop erosion on dam; investigate conditions of the service spillway outfall pipe and recommend remedial measures if necessary; investigate slippage failures and recommend remedial measures; develop a continuing investigation and maintenance program; develop an emergency action plan to alert downstream residents in the event a major problem develops with the dam.

In addition, the owner should: Check seepage flows often to determine any changes in the quantity or color until engineers are engaged; and prevent the accelerated undercutting of the upstream slope by stopping water skiing close to the slope.

TABLE OF CONTENTS

OVERVIEW PHOTO

PHASE I INSPECTION

GRAND VALLEY DAM NO. 1

HARDEMAN COUNTY, TENNESSEE

SECTION 1 - GENERAL

1.1 Authority - The Phase I inspection of this dam was carried out under the authority of the Tennessee Code Annotated 70-2501 to 70-2530, "The Safe Dams Act of 1973", in cooperation with the Corps of Engineers under the authority of PL 92-367, "The National Dam Inspection Act".

1.2 Purpose and Scope - This report is prepared under guidance contained in Department of the Army, Office of the Chief of Engineers, Recommended Guidelines for Safety Inspection of Dams, for a Phase I investigation. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general conditions of the dam is based upon available data and visual inspections. Detailed investigation and analysis involving topographic mapping, subsurface investigation, testing and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. Additional data or data furnished containing incorrect information could alter the findings of this report.

It is important to note that the condition of the dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions will be detected.

1.3 Past Inspections - The Tennessee Division of Water Resources has made three inspections of the Grand Valley Dams, on 12/5/75, 9/9/77, and 3/12/79. Copies of correspondance and inspection reports can be found in Appendix F.

1.4 Miscellaneous Details - On the day of the Phase I inspection, the weather was cloudy with temperatures in the mid 70's and the wind was calm. The level of the lake was at the crest of the service spillway.

1.5 Inspection Team Members - Field inspection was performed by the following Winsett-Simmonds, Consterdine & Associates, Inc. personnel:

William E. Bush, P.E.
Civil Engineer

Dr. Fred H. Kellogg, P.E.
Geotechnical Engineer

The team was accompanied by Messrs. George Moore and David Roe of the Tennessee Division of Water Resources.

SECTION 2 - PROJECT DESCRIPTION

2.1 Location - Grand Valley Dam No. 1 is located in Hardeman County, Tennessee seven miles east of Hickory Valley, Tennessee. It can be located on USGS Map, "Middleburg, Tennessee", at longitude 89°01'01" and latitude 35°09'04".

2.2 Description

2.2.1 Embankment - Grand Valley Dam No. 1 is an earth embankment dam with a northeast-southwest orientation, a maximum height of 37 feet, and a length of 1800 feet. The crest width is 26 feet. The upstream slope averages 1V on 3H from the waterline to the top of the dam. The downstream slope ranges from 1V on 3H to 1V on 5.3 H. Embankment sketches are provided in Exhibit B.

2.2.2 Service Spillway/Low Level Outlet - The service spillway is an 11 foot by 8 foot concrete riser with two 9.0 foot by 0.83 foot openings protected by fence wire. The outfall pipe through the dam is a 42 inch CM pipe approximately 550 feet in length.

2.2.3 Emergency Spillway - The emergency spillway was constructed as a low area in the top of the dam near the left abutment. The exit slope is the downstream slope of the dam and is unprotected. The control section is the paved road which is 20 feet in width.

2.2.4 Reservoir and Drainage Area - The reservoir has a surface area of 85 acres at normal pool elevation with a fetch of 5000 feet.

The normal impounding capacity of the reservoir is estimated to be 985 acre-feet with an additional 492 acre-feet of flood storage. The drainage area is 734 acres and the predominant soil group is Memphis-Loring-Lexington.

2.2.5 Miscellaneous - Steroscopic review of the November 28, 1971 aerial photographs in the Soil Conservation Service office in Boliver, Tennessee reveal the dam to be under construction and approximately 95 percent complete. The dam was not closed as a "V" section beginning at about Station 6+00 and ending at about Station 9+00, and had been left open for drainage. No construction plans are available for the embankment. Plans for the riser and outfall pipe were not available.

SECTION 3 - INSPECTION FINDINGS

3.1 Specific Findings - Grand Valley Dam No. 1 has a history of problems of severe surface erosion. A review of correspondence from the Division of Water Resources to the owner, dating back to October 1, 1975 to present, reveals a continuing problem of excessive erosion and gulleying on the downstream slope. Seepage was first noted at the downstream toe in 1979 inspection reports. In 1979 the owner proposed to correct both the erosion and seepage by installing a toe drain system in the backslope and by filling in the gullies and reseeding the slope. No toe drain was observed during this inspection, but the backslope has been reshaped and reseeded.

3.1.1 Embankment

Geology- Soil in the area is a medium grained red sand with many clay interbeds. Some of the clay has a shaley structure, and all is hard and well consolidated. The clay is dispersive, and all the soils are highly susceptible to erosion. The uppermost foot or so of the clay shows a rhombic cleavage. On the south side, the soils are cherty, with considerable clay of low to high plasticity (Groups CL to CH in the Uniform Classification System). On the north side the sand is sandier, and contains a significant proportion of small, water-washed gravel. The sands belong to the basal member of the Claiborne Formation.

Crest- Grand Valley Dam No. 1 is a compacted earth fill dam with a crest width of 26 feet. A 20 foot paved road

traverses the crest of the dam. The longitudinal alignment is straight for most of the dam with a dog leg near the right abutment. No longitudinal or transverse surface cracks were noted along the crest. There was no undesirable growth on the crest of the embankment.

Upstream Slope - The upstream slope has no undesirable vegetation. This slope is unprotected and has been cut back several feet because of wave action. Sloughing is continuous along the slope at the waterline with some areas eroding to within ten feet of the edge of the pavement on the crest. The entire slope has been terraced below the water level, for distances of 10 to 15 feet, by wave action. The owner stated that water skiing contributes significantly to this washing. The slope is very rough and irregular under the grass cover above the terrace. The vertical face that extends one to two feet above the waterline is being progressively undermined. The fill is hard, well-compacted, and very sandy. Chunks of this material placed under water disintegrate completely in two or three minutes. The low permeability of the compacted fill in place limits the speed of disintegration, and this is what has kept the entire upstream slope from cutting back to the crest and beyond. Animal boreholes were found about three feet above water level. No surface cracks were noted on the upstream slopes.

Downstream Slope - There is very little undesirable growth or debris on the downstream slope. From Station 3+00 to 5+00, there is a slide approximately 200 feet long with a drop of about three feet vertically. Other small slides were found along the backslope. The entire backslope is beginning to severely erode forming gullies. No surface cracks other than slides were observed nor was there evidence of heaving at the embankment toe. No piping or boils were observed at the toe of the slope, although the toe was wet. A bulldozer has recently worked on the backslope and in the area below the dam to fill previous gullies and has left several rough areas in which water is standing near the toe of the dam. Excessive erosion is also occurring in the track depressions. There is no evidence of surface cracks or heaving beyond the embankment toe. For other deficiencies, see Section 3.1.3 for seepage.

Abutments - Erosion was encountered at both abutments and was particularly bad at the left abutment. At the right abutment, it is hard to discern where the embankment ends and the knife-shaped spur which forms the abutment begins. This ridge is covered with heavy brush and 8 to 14 inch diameter trees. Gullies, and a bench from old erosion, are covered with grass and trees. This condition is similar on both the upstream and downstream sides. The actual fill begins near the boat launch ramp. At the fill abutment contact,

there is a two foot deep gulley on the downstream slope and a badly eroded condition at the toe.

3.1.2 Seismic Zone - Grand Valley Dam No. 1 is in Seismic Zone 2. No record of any stability analysis could be found.

3.1.3 Seepage - Wet areas were observed all along the slope at varying heights. At approximately Station 15+00, the toe is wet. This wet condition extends to within ten feet vertically of the crest. A slight distance to the south, free water was flowing at the bottom of a gulley near the toe and the gulley was wet to approximately 12 feet vertically of the crest. At approximately Station 14+00, the toe is wet and the fill is soft. At Station 12+00, the fill is all wet and soft for about 1/3 of the distance from the toe to the crest. At Station 11+50, there is a seep about ten feet above the toe. The slope is badly eroded, and the fill is wet and soft over the bottom quarter of the slope. This condition extends to about Station 10+00. South of this, the toe is wet and swamp grass and cat tails are growing west of the toe. At approximately 6 + 50, another series of seeps was found extending to about Station 6+00. This seep starts about 15 feet vertically above the toe and 20 feet below the crest. A gulley extends to within five feet of the crest and a capillary waterline shows on the sides of this gulley extending at least halfway up the slope. An auger hole was bored at the bottom of this gulley about

55 feet measured along the slope from the crest. This gulley is about two feed deep and water in the auger hole was three feet below this elevation. A second auger hole was bored about 20 feet along the slope below the first one. The ground is six feet lower vertically and the water was found two feet below this elevation. At approximately Station 5+00, a six foot gulley has formed about 1/3 of the way up the slope. The soil at the bottom of this gulley is damp. The soil is a hard-packed, silty chert and is damp to within 15 feet of the crest vertically. Free water shows at the toe. There is a large wet area below the toe of the dam, although no boils were observed. Swamp grass abounds in this area and the water has some color which appears to be iron oxide. No relief wells, drains, or other appurtenances were observed.

3.1.4 Spillways - The service spillway intake structure is a concrete box riser with weir openings on two sides. The 42 inch outlet pipe is corrugated metal and is cantilevered about six feet over the plunge pool at the exit end. No structure was observed to support this section of pipe as it is undermined by the plunge pool. No leakage was observed between the pipe and the soil at the discharge end. Approximately 40 feet from the outlet back toward the dam, the ground has caved in over the pipe. This hole is approximately five feet in diameter at ground level. An auger hole bored

in the depression showed a sandy clay for about 2½ feet and then the auger hit wood debris. There was water at the bottom of the hole suggesting possible leakage at one of the joints of the pipe.

Emergency Spillway - The emergency spillway was constructed as a low area in the top of the dam. Flows exceeding the capacity of the service spillway and flood storage will flow over the low section at the top of the dam at Station 1+50. The height of the embankment here is about two feet. The low section extends to Station 2+00 where the height of the dam is approximately four feet. The spillway side slope gradually rises to Station 6+00 which gives the spillway a depth of four feet and the height of the fill is approximately 26 feet. The entrance channel for the spillway is the upstream slope which is approximately 1V on 3H and the control section is the paved road section on the top of the dam. The exit channel is the downstream slope of the dam and is not protected. It would be subject to extreme erosion if the spillway was used. The downstream slope in the vicinity of the spillway has already experienced a slippage failure. No protection has been provided for the exit channel in the form of vegetative cover or riprap

The emergency drawdown facility is a gate valve located on the upstream side of the concrete riser. Steroscopic re-

view of the aerial photographs taken immediately before closure of the dam shows the bottom of the service spillway located several feet higher than the low point in the valley; therefore, it appears that the impoundment cannot be completely drained with this facility.

3.1.5 Downstream Inspection and Hazard Classification - Grand Valley Dam No. 1 has a downstream hazard potential classification of high. Inspection of the area downstream from the dam indicates that about eight mobile home lots in a recreational subdivision would be affected in the event of failure of Grand Valley Dam No. 1. One lot was occupied at the time of inspection. Most of the occupied lots in the subdivision have permanently installed mobile homes, but some are used for camper trailers. Few of the lots are used as full time residencies making the number of persons in the probable flood path variable within the estimated maximum of 25.

3.1.6 Hydrology and Hydraulics - According to O.C.E. Guidelines, dams with a high hazard, intermediate size classification should have the storage and spillway capacity to pass the PMF without overtopping the dam. The Probable Maximum Precipitation (PMP) of 29.7 inches in six hours yields a PMF of 24.72 inches. Time of concentration of the uncontrolled area of Grand Valley Dam No. 1 was estimated to be 0.93 hours and the flood storage from normal pool to the

low point of the top of the dam is estimated to be 492 acre-feet. Routing of the PMF (Antecedent Moisture Condition II) produced a peak outflow of 5400 cfs, which reach a depth of 4 feet in the emergency spillway, and produced a flow in excess of nine hours.

The 100-year, 6-hour flood was routed through the structure. Grand Valley Dam No. 1 contained this storm with a freeboard of 2.2 feet. The 1-10 day, 100-year storm was routed through the structure and did not produce flow in the emergency spillway.

3.2 Conclusions and Recommendations

3.2.1 Conclusions

a. Hydraulic analysis indicates that Grand Valley Dam No. 1, in the event of the design flood, will sustain depths of flow up to four feet in the area designated for the emergency spillway for a total flow duration of nine hours. On the basis of engineering judgment and visual observations, the spillway will sustain major damage causing possible breaching of the structure.

b. On the basis of engineering judgment and visual observations, the downstream slope appears unstable for the following reasons: Several areas of dampness and flowing water were noted on the downstream

slope. The entire backslope is beginning to gulley. Near the left abutment, a major slope slide occurred about ten feet below the crest with a vertical scarp some three to five feet high extending approximately 200 feet. The area immediately downstream at the toe of the dam has been swamped out with free water standing.

c. The entire upstream slope has been terraced below the water level. The vertical face that extends one to two feet above the waterline is being progressively undermined. The low permeability of the compacted fill in place limits the speed of disintegration and this is what has kept the entire upstream slope from cutting back to the crest and beyond.

d. The service spillway outfall pipe appears to have a failure approximately 40 feet from the discharge end of the pipe, but this should not affect the stability of the dam if corrected in a reasonable length of time.

e. The seismic resistance of this dam is unknown, but, under this program, dams in Seismic Zone 2 may be assumed to be adequate against seismic loading if they are judged adequate in static stability requirements.

f. Grand Valley Dam No. 1 is considered as "Unsafe-Non-emergency" because it is a dam with obviously serious deficiencies which clearly could develop or are developing into failure modes but do not yet pose the threat of immediate failure.

3.2.2 Recommendations - Remedial work should begin as soon as possible. The dam's condition should be checked often by the owner for changes in the quantity and color of the seepage water until remedial work is begun, and consideration should be given to methods and length of time required to completely draw down the reservoir. Qualified engineers should be engaged immediately to:

a. Recommend project modifications that will allow the emergency spillway to safely pass the design flood.

b. Investigate seepage problems on the downstream slope and toe, and recommend remedial measures.

c. Recommend methods to stop erosion on both upstream and downstream slopes.

d. Investigate conditions of service spillway outfall pipe and propose remedial measures if needed.

e. Investigate embankment stability problems as evidenced by slippage failures on the downstream slope and propose corrective measures to provide stable slopes for the dam.

f. Develop an inspection and maintenance program for the dam to be carried out at least annually.

g. Develop an emergency action plan to alert downstream residents in the event a major problem develops with the dam.

In addition, the owner should:

a. Prevent accelerated undercutting of the upstream slope by stopping water skiing close to the slope.

SECTION 4 REVIEW BOARD FINDINGS

The Interagency Review Board for the National Program of Inspection of Non-Federal Dams met in Nashville on 16 July 1981 to examine the technical data contained in the Phase I investigation report on Grand Valley Dam No. 1. The Review Board considered the information and recommended that (1) Section 3.1.5 should be expanded to include a discussion of the transient nature of the mobile home and how many people could usually be expected to be in the flood path, and (2) the location of the 42-inch pipe should be shown on the profile drawing. They agreed with other report conclusions and recommendations. A copy of the letter report presented by the Review Board is included in Appendix H.

APPENDIX A

DATA SUMMARY SHEET

APPENDIX A
DATA SUMMARY SHEET

A.1 DAM - Grand Valley Dam No. 1

A.1.1 Type - Earth Fill

A.1.2 Dimensions and Elevations were determined from assuming a normal pool elevation as shown on the USGS 15 minute quadrangle, "Hebron, Tennessee".

a.	Crest length	1800 feet
b.	Crest width	26 feet
c.	Height (max.)	37 feet
d.	Crest elevation (low point)	455 feet
e.	Service spillway elevation	449.9 feet
f.	Emergency spillway elev. right	None
g.	Emergency spillway elev. left	None
h.	Embankment slope, U/S (from water surface to crest)(ave.)	1V on 3.3H
i.	Embankment slope, D/L (from lower slope to crest) (ave.)	1V on 4.0H
j.	Size classification	Intermediate

A.1.3 Zones, Cutoffs, Grout Curtains — None

A.1.4 Instrumentation — None

A.2 RESERVOIR AND DRAINAGE AREA

A.2.1 Reservoir - (Normal pool elevation 449.9, 5.1 feet below the effective crest).

a.	Surface area	85 acres
b.	Length of pool	5000 feet
c.	Capacity (normal pool)	985 acre-feet
d.	Maximum surface area	113 acres
e.	Flood storage	592 acre-feet

A.2.2 Drainage Area

a. Size - 734 acres (1.15 square miles)
b. Characteristics:
Average watershed slope 37%, soil group, Memphis-Loring-Lexington; cover, woodland 32%, open land 49%, water 19%.

c.	Runoff PMF (AMC II)	24.72 inches
d.	Runoff ½ PMF (AMC II)	12.36 inches
e.	Runoff P_{100} (AMC III)	3.73 inches

A.3 OUTLET STRUCTURES

A.3.1 Drawdown Facilities - Reservoir can be partially drawn down by gate valve at bottom of riser.

A.3.2 Service Spillway - Concrete box riser (11' x 8') with 9' x 0.83' weir openings on two sides. The outlet structure is a 42" corrugated metal pipe.

a. Crest elevation	449.9 feet MSL
b. Length (pipe)	549 feet
c. Maximum discharge capacity	83 cfs
d. Elev. bottom of riser (est.)	441 feet MSL

A.3.3 Emergency Spillway - Low area top of dam — Crest elev. - 455.0 feet

A.4 HISTORICAL DATA

A.4.1	Construction Date	1971
A.4.2	Designer	Unknown
A.4.3	Builder	Unknown
A.4.4	Owner	Grand Valley Property Association (Dwayne Williams, Pres.)
A.4.5	Previous Inspection	12/5,75; 9/9/79; 3/12/79
A.4.6	Seismic Zone	2

A.5 DOWNSTREAM HAZARD DATA

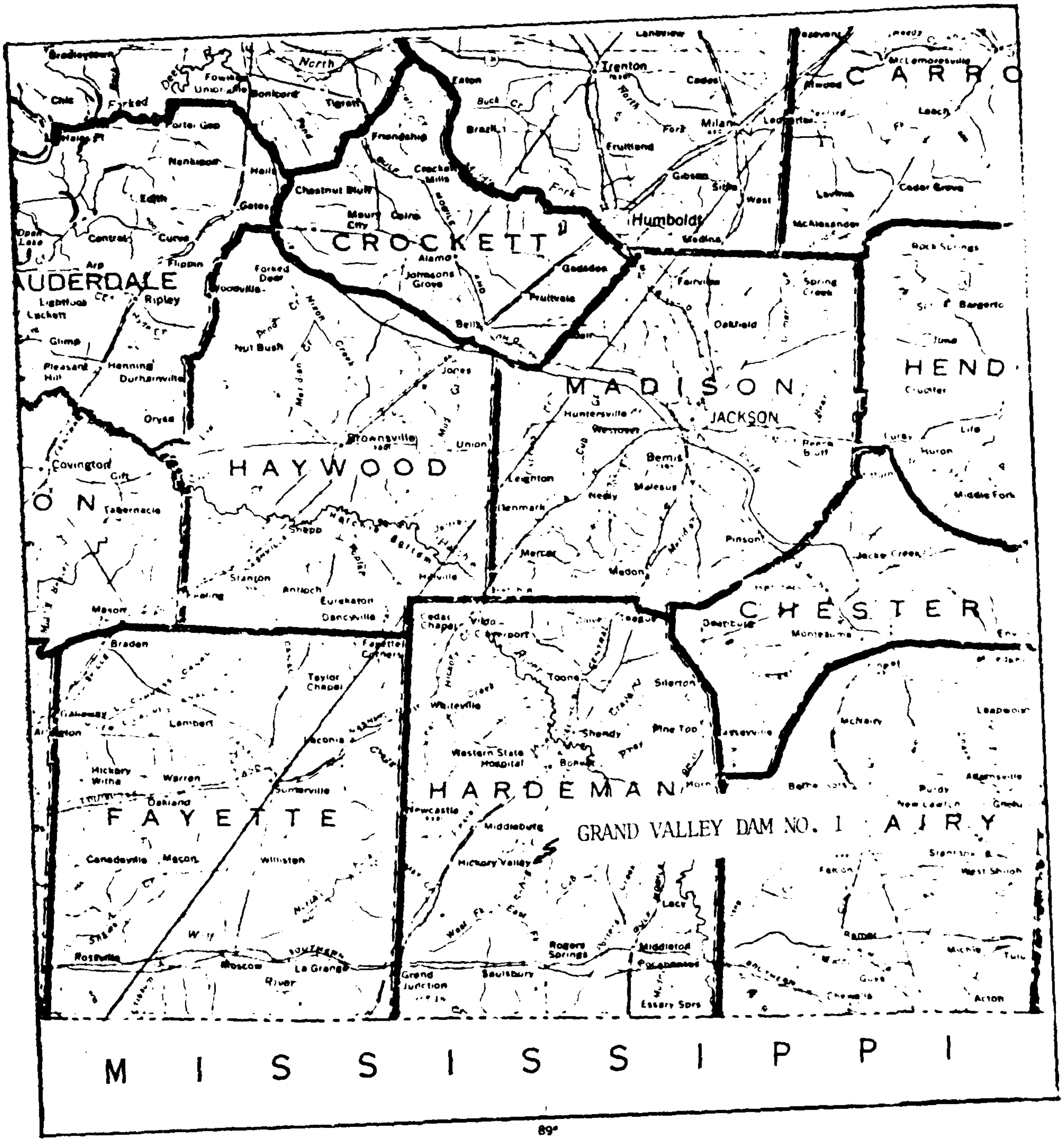
A.5.1 Downstream Hazard Potential Classification

a. Corps of Engineers	High
b. State of Tennessee	I

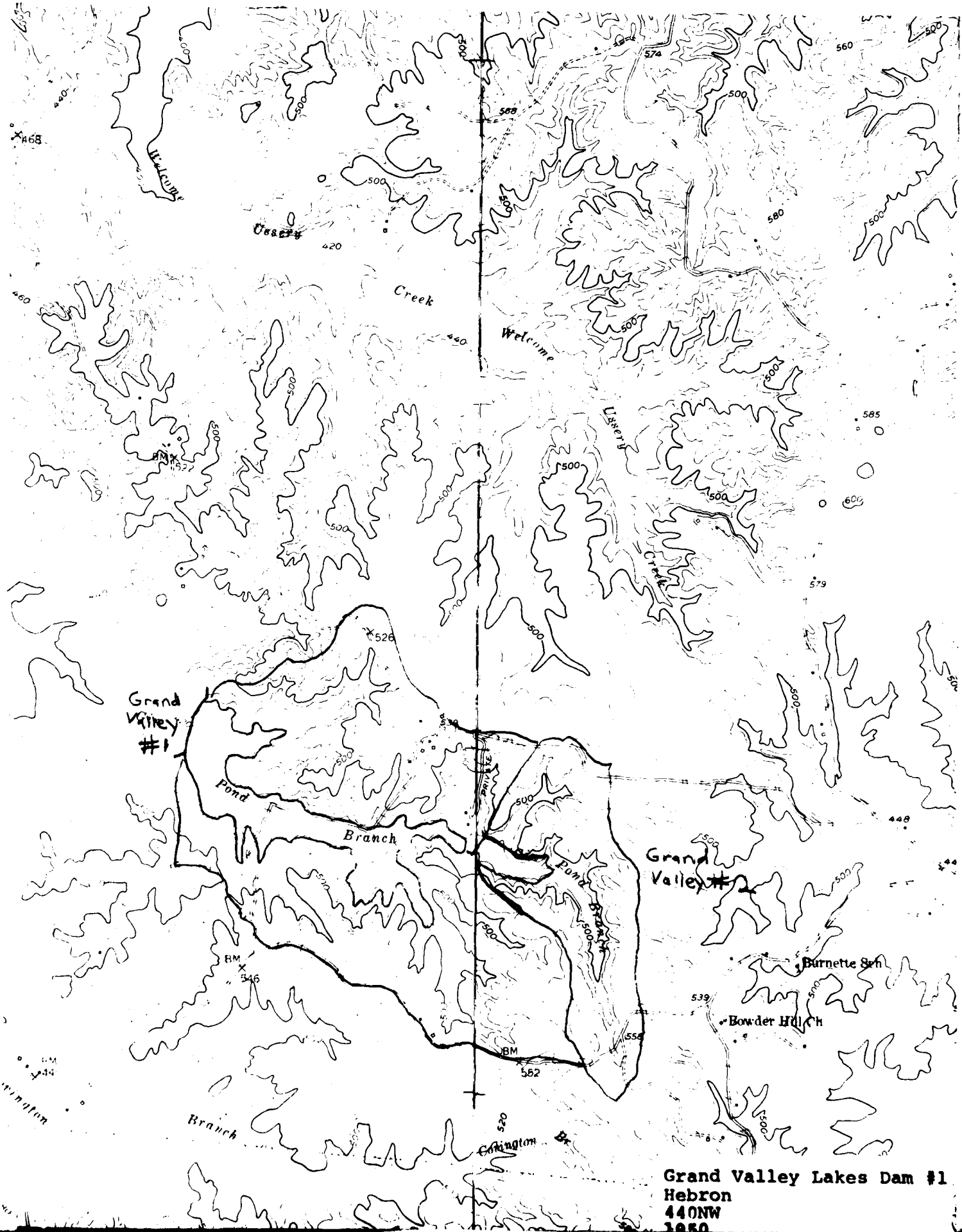
A.5.2	Persons in Probable Flood Path	Maximum of 25
A.5.3	Downstream Property	Mobile Home Subdiv.
A.5.4	Warning Systems	None

APPENDIX B

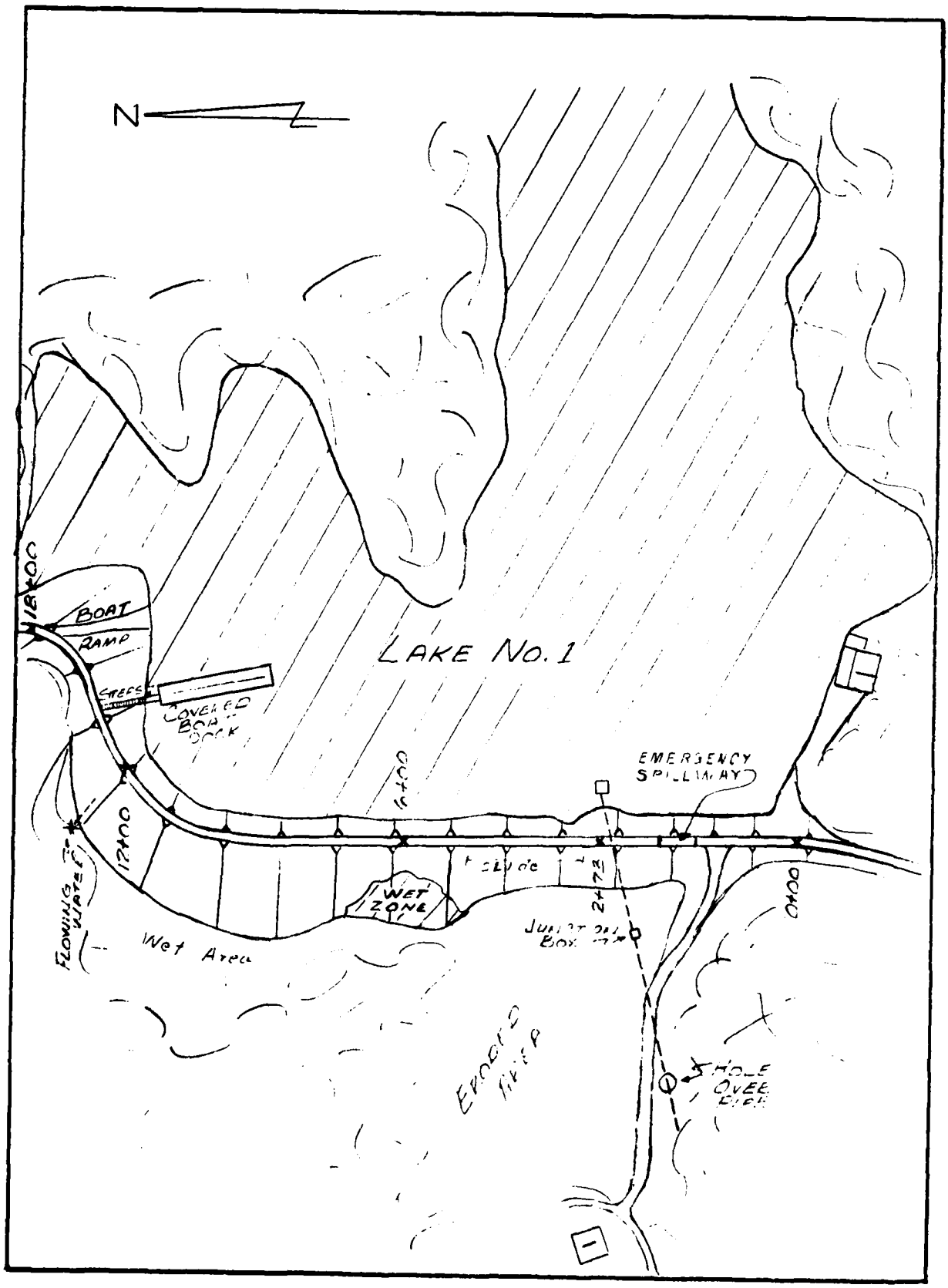
SKETCHES AND LOCATION MAPS



LOCATION MAP

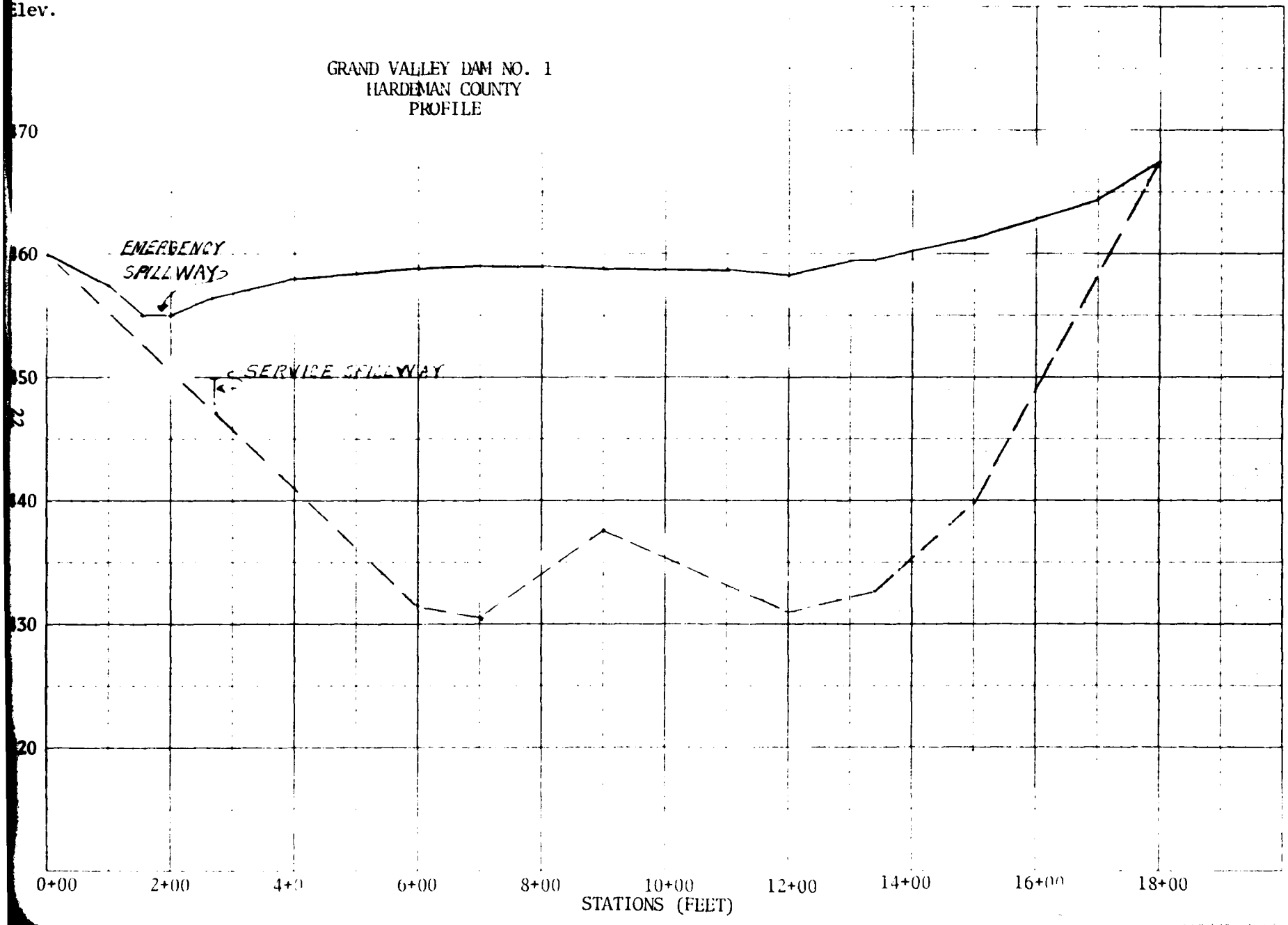


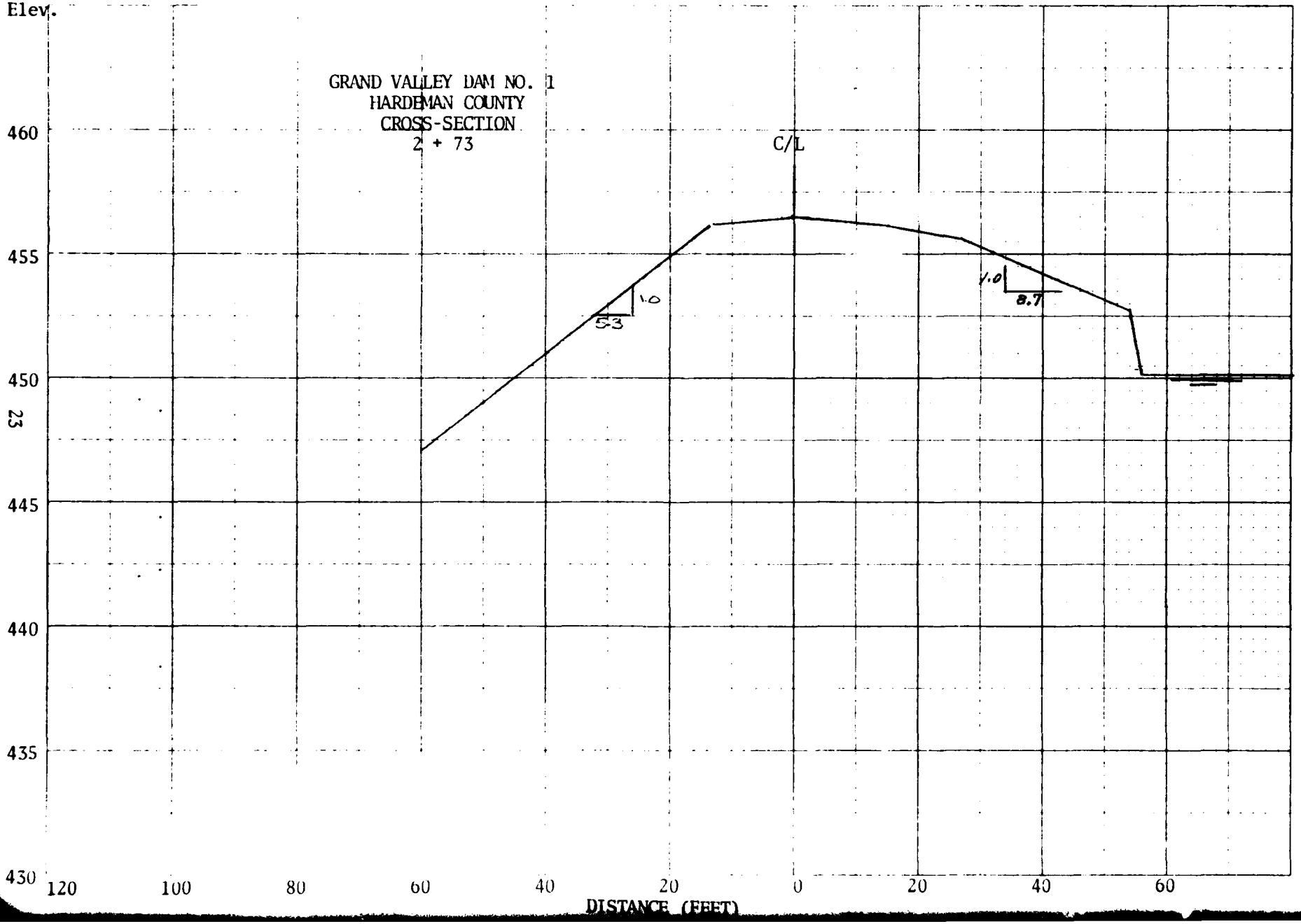
Grand Valley Lakes Dam #1
Hebron
440NW
1950



GRAND VALLEY DAM NO. 1

46 0780


Elev.
GRAND VALLEY DAM NO. 1
HARDEMAN COUNTY
PROFILE
170
160
150
140
130
120
EMERGENCY SPILLWAY
SERVICE SPILLWAY
0+00
2+00
4+00
6+00
8+00
10+00
12+00
14+00
16+00
18+00
STATIONS (FEET)



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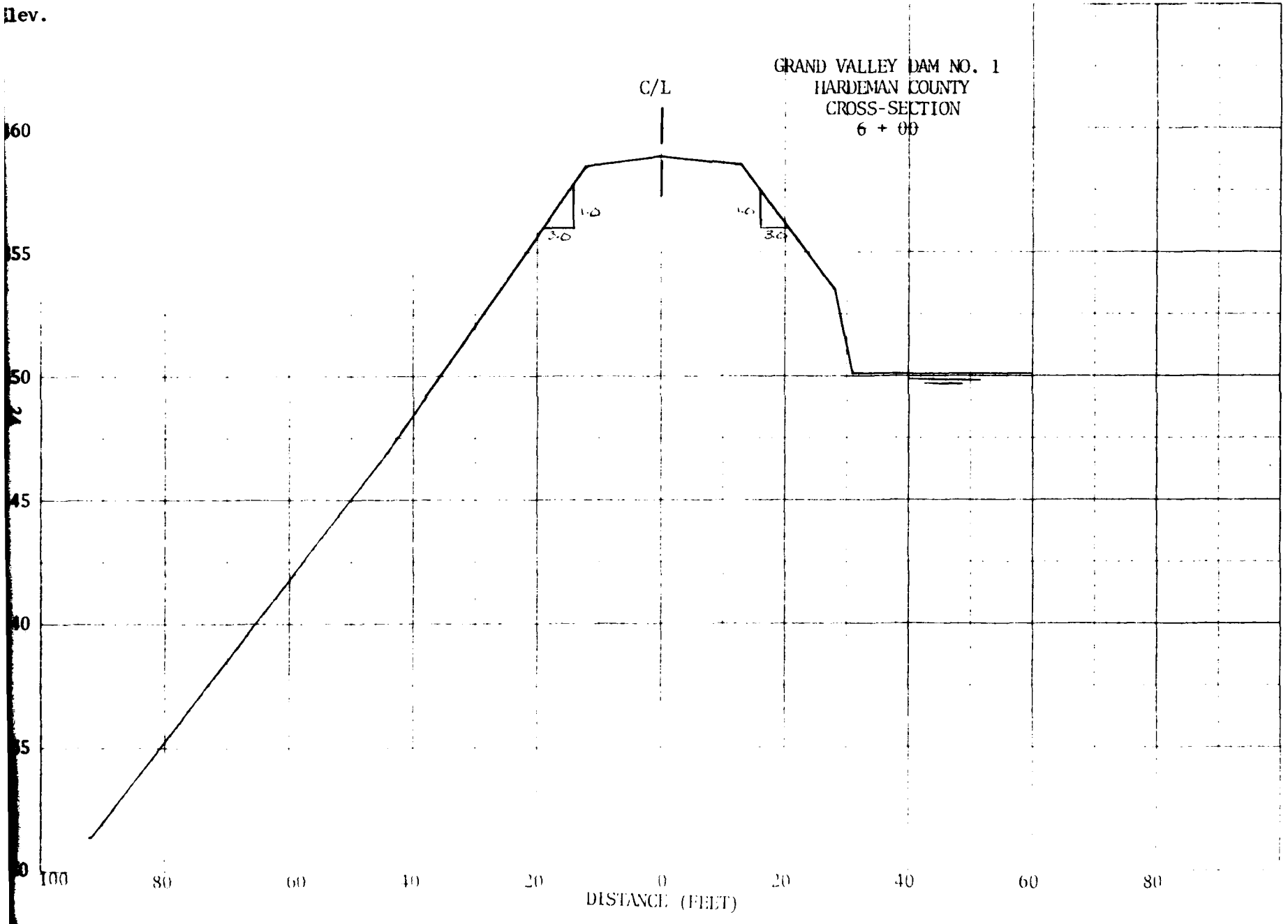
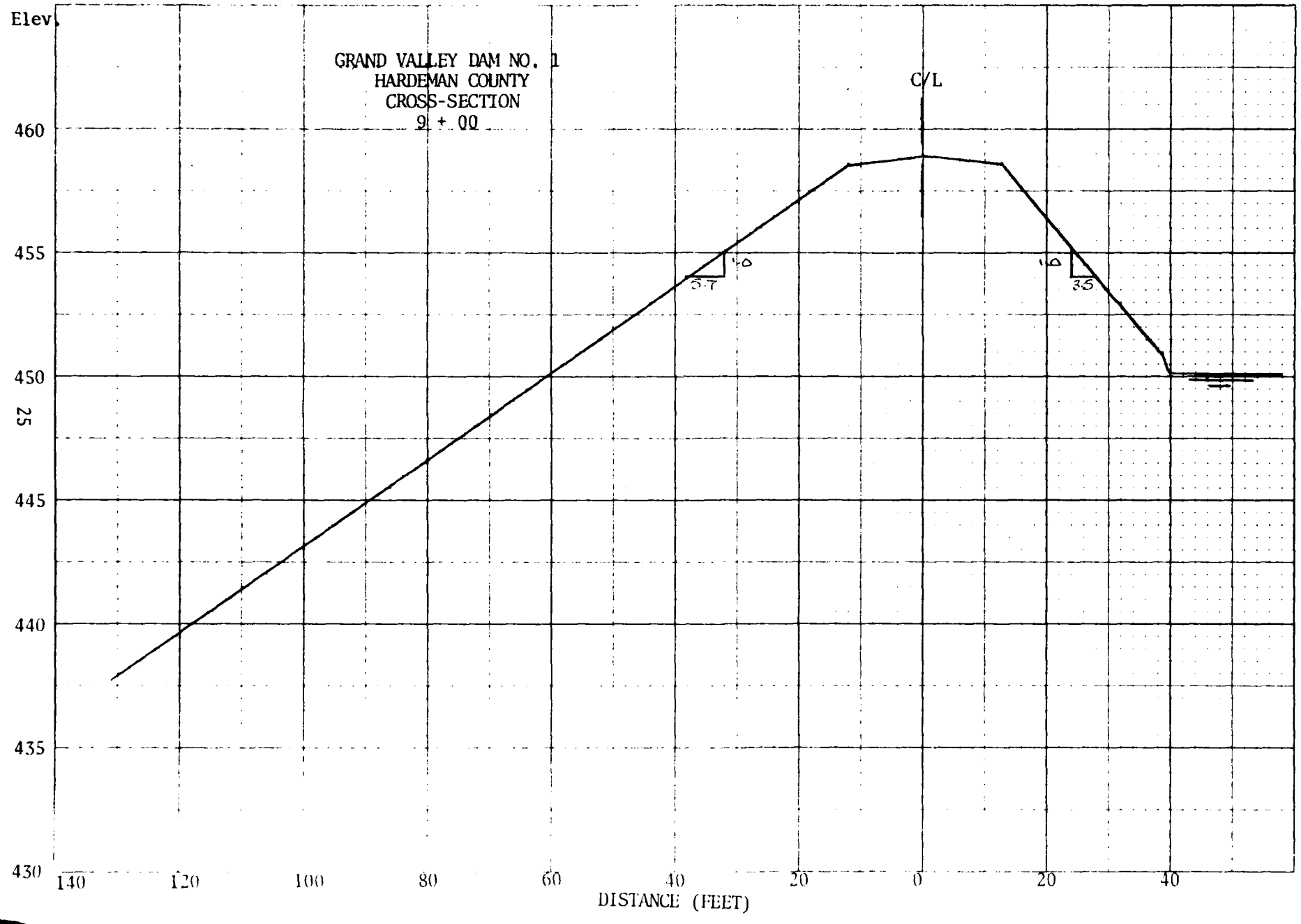
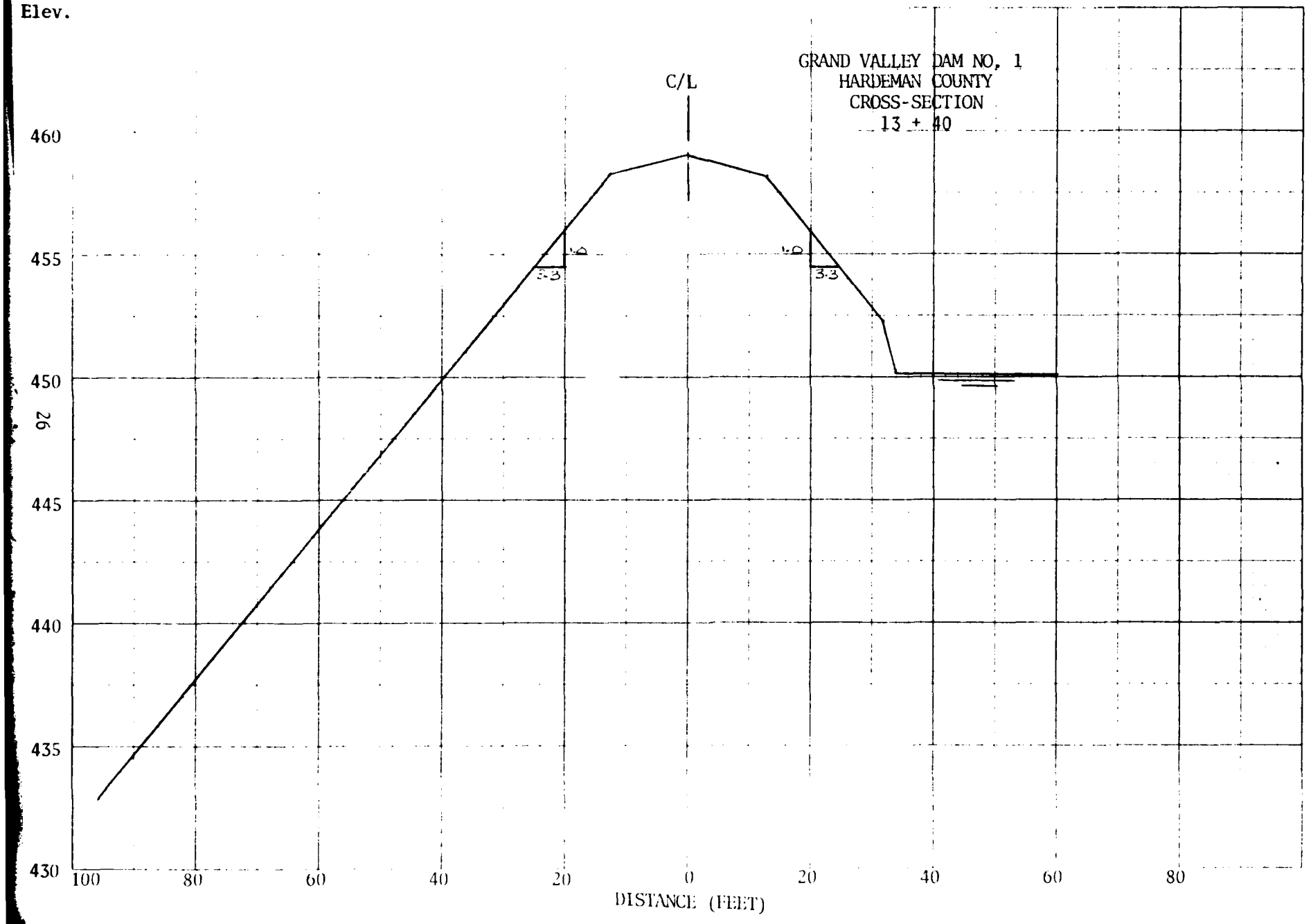

GRAND VALLEY DAM NO. 1
HARDEMAN COUNTY
CROSS-SECTION
6 + 00
C/L
Elev.
60
55
50
45
40
35
30
1:0
3:0
100
80
60
40
20
0
20
40
60
80
DISTANCE (FEET)



46 0780


Elev.
GRAND VALLEY DAM NO. 1
HARDEMAN COUNTY
CROSS-SECTION
13 + 40
C/L
460
455
450
445
440
435
430
1
3.3
1
3.3
100
80
60
40
20
0
20
40
60
80
DISTANCE (FEET)

APPENDIX C

PHOTOGRAPHIC RECORD

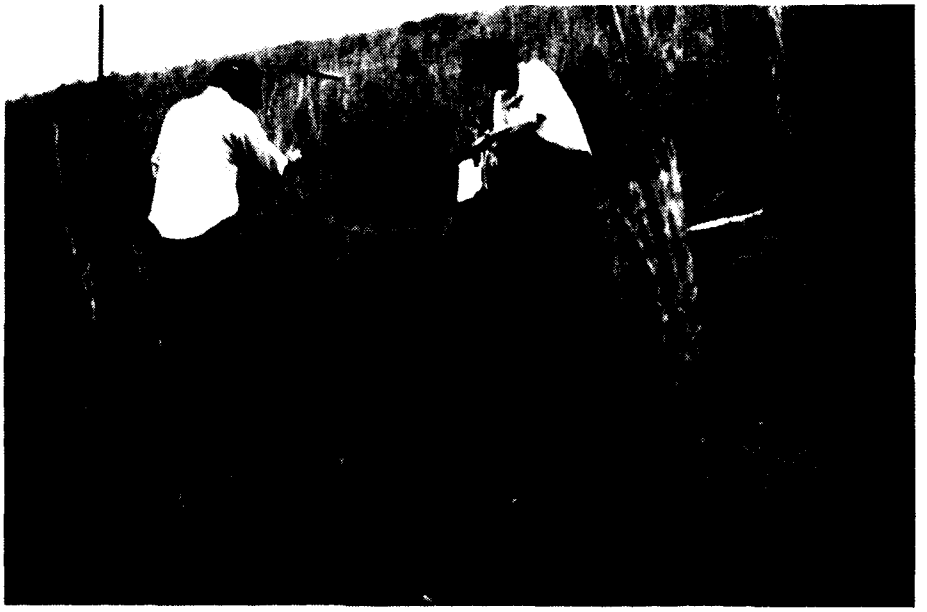
1. Top of Grand Valley Dam No. 1.

2. Upstream slope of Grand Valley Dam No. 1.

3. Typical erosion of upstream slope of Grand Valley Dam No. 1.

4. Downstream slope of Grand Valley Dam No. 1. Note erosion.

5. Slip on downstream slope near left abutment on Grand Valley Dam No. 1.



6. Wet area on downstream slope near Station 6+00, Grand Valley Dam No. 1.

7. Wet area at toe of downstream slope, Grand Valley Dam No. 1. Note flowing water.

8. Service spillway, Grand Valley Dam No. 1.

9. Low area at top of dam near left abutment used as emergency spillway.

10. Exit slope of emergency spillway. Note concrete headwall at center of photo is inlet to service spillway outfall pipe.

APPENDIX D

INSPECTION TEAM TRIP REPORTS

TRIP REPORT
GRAND VALLEY NO. 1 DAM
HARDEMAN COUNTY, TENNESSEE

GENERAL ENGINEERING OBSERVATIONS
April 14, 1981

GENERAL. An engineering inspection of the Grand Valley Lake No. 1 was made with Dr. Fred H. Kellogg, Kellogg Engineering; George Moore and David Roe of the Tennessee Division of Water Resources. The weather was cloudy with temperatures in the mid 70's and the winds were calm.

Grand Valley Dam No. 1 has a history of problems of severe surface erosion. A review of correspondence from the Division of Water Resources to the owner dating back to October 1, 1975 to present, reveals a never ending problem of excessive erosion and gulleying of the downstream slope. Seepage was also noted at the downstream toe in the 1979 inspection reports. In 1979 the owner proposed to correct both the erosion and seepage by installing a toe drain in the backslope and filling in the gullies and re-seeding. The toe drain was not installed but the backslope was filled, smoothed, and re-seeded.

EMBANKMENT. Grand Valley Dam No. 1 is a compacted earth fill dam with a crest width of approximately 25 feet, and estimated 3:1 side slopes on the upstream and downstream sides. The crest of the dam is a paved road that serves the subdivision. The longitudinal alignment is straight for most of the dam with a dog leg near the right abutment. No longitudinal or transverse surface cracks were noted. There was no undesirable growth

on the crest of the embankment.

There was no undesirable growth or debris on the upstream slope. The upstream slope has no mechanical protection from wave action and has been cut back several feet because of the wave action. Sloughing is continuous along the slope at the water line. Some areas have eroded to within ten feet of the edge of the pavement on the crest. The grass on the slope has been ineffective against erosion of the slope. No surface cracks were noted on the upstream slope.

There was very little undesirable growth or debris on the downstream slope. Near the left abutment, there is a slide approximately 200 feet long with a drop of approximately three feet vertically. Many other small slides were found all along the backslope. The entire backslope is beginning to severely erode, forming gullies. No surface cracks, other than the slides, were noted nor was there evidence of heaving at the embankment toe. Wet areas were observed all along the slope at varying heights. There were several jugs observed on the backslope. One wet area on the backslope at approximately Station 12+00 had water flowing from it. Auger holes at Station 6+00 found water at approximately 2.5 feet approximately 15 feet below the top of the dam. A second hole found water at two feet approximately 20 feet below the top of the dam. No piping or boils were observed at the toe of the slope, although the toe was wet. There is no toe drainage system installed in this dam. The fill contact with the outlet structure is fair. The outlet pipe is cantilevered about six feet out over the plunge pool which has eaten back under the pipe. Erosion has eaten

out under the grass cover for the backslope. Erosion was encountered at both abutments and was extremely bad on the left abutment. Erosion was also encountered near the boat dock. No springs or seepage along the contact of the embankment with the abutments was observed. In the area downstream from the embankment, no subsidence, depressions, or sinkholes were noted. There is a large seepage area below the toe of the dam, although boils were not noted. Swamp grass abounds in this area below the toe of the dam. Seepage water in this area has some color which appeared to be iron oxide. A bulldozer has worked on the backslope and in the area below the dam and has left several rough areas in which water was standing in near the toe of the dam. Erosion was occuring in the track depressions. There was no evidence of surface cracks or heaving beyond the embankment toe. The outfall channel has entrenched into a hard clay material that appears to be resisting further erosion. The channel slopes are covered with brush and other wild grass. No relief wells, drains, or other appurtenances were found. There was no instrumentation on the dam.

The service spillway intake structure is a concrete box riser with weir openings on two sides. A woven wire fence material protects the openings from debris. The outlet structure is a corrugated metal pipe that is cantilevered about six feet over the plunge pool. No support structure was observed to protect this section of pipe from being undermined as the plunge pool cuts back up under the pipe. The outfall pipe is estimated to be a 42 inch corrugated metal pipe and has no coating at the present time. It appeared to be coated originally and the coating has disintegrated.

The pipe appeared to be approximately 14 gauge material and of spiral construction. Approximately 40 feet from the outlet end of the pipe back towards the dam, the ground has caved in over the pipe. This hole is approximately five feet in diameter and probing in this hole, debris is encountered, such as old tree limbs and so forth, several inches below the surface. A concrete box is located approximately 200 feet towards the dam from the outlet end of the pipe. It appears that the pipe had been extended at some time in the past. The box is open, at the top, and serves as an inlet for surface waters.

No emergency spillways have been constructed in either abutment. The present emergency spillway was constructed as a low area in the top of the dam. Flows exceeding the capacity of the service spillway and storage will flow over this low section near the left abutment. The entrance channel is the upstream slope approximately 3:1 and the control section is the paved road section across the top of the dam. The exit channel is the backslope of the dam would be subject to extreme erosion if used. The backslope in the vicinity of the spillway has already experienced a slippage failure. The vegetative cover is fescue and wild grass and it provides an ineffective cover against erosion. The emergency drawdown facility is a pipe in the intake structure with a gate valve. It is not believed the lake can be completely drained with this facility. The facilities were not operated during this inspection. The owner stated that the gate had been opened last year without difficulty.

The reservoir slopes are in good condition. Sedimentation of the lake is unknown and there was very little turbidity as the lake is clear. The downstream area has not been cleared and it was difficult to make any further observations. The downstream area has also been subdivided into small lots for trailer type developement. Only one trailer was noted in this area.

CONCLUSIONS. Although the upstream slope has been damaged by wave action, the primary problems in the dam appear to be in the backslope. There are many areas in the backslope which are wet and in a few places, one in line with the marina, there is flowing water. The toe of the backslope is wet and standing in water. There were several jugs found along the backslope, some interconnected. In one area near Station 6+00, we augered a hole in a gullied area and hit water at two or three feet. This area was approximately 15 feet below the top of the dam. A second hole was augered approximately 20 feet below the top of the dam. This hole hit water at two feet. The slope of the water surface on the backslope seems to be rising. This would indicate that the problem is not underseepage, but is a problem of water coming through the dam along the phreatic line.

RECOMMENDATIONS. The conditions found on the backslope of this dam and along the outfall pipe warrant a Phase II investigation at an early date. This investigation should include test borings to determine the cause of wetness on the backslope and the cause of

GROUND VALLEY DAM NO. 1
INSPECTION REPORT

INTRODUCTION. This is a 40-ft high earth dam located in Hardeman County, north of Hickory Valley, Tenn. The dam is built across Pond Branch, a tributary of Spring Creek. It is understood that the dam was built in 1972, with a clay core and sandy shoulders, and that no drilling was done prior to construction. Normal pool level is at elevation 450.9. The soil in the area is a medium-grained red sand with many clay interbeds. Some of the clay has a shaley structure, and all is hard and well consolidated. The clay is dispersive, and all the soils are highly susceptible to erosion. The uppermost foot or so of the clay shows a rhombic cleavage. On the south side, the soils are cherty, with considerable clay of low to high plasticity (Groups CL to CH in the Uniform Classification System). On the north side, the soil is sandier, and contains a significant proporation of small, water-washed gravel. The sands belong to the basal member of the Claiborne Formation.

South(Left)Abutment. This abutment is a high hill, the top of which is well above water level. The high ridge extends along the south side of the lake. Apparently, some of the fill material for the dam was borrowed out of this hill, west of the road that crosses the dam. The contact between the downstream slope of the dam and the abutment was badly eroded, with gulleys 3 to 4 ft deep extending from the top to the toe of the dam. The abutment soils are mainly sandy clays of Groups CL to CH, with a very stiff to hard consistency.

Service Spillway. An overflow spillway is located near the south aboutment and about 15' out in the water. It was originally on the upstream slope, probably, and erosion has separated it from the embankment. This is a concrete platform with screen protecting the overflow

and a screen in the water beyond the platform. The concrete riser is about 8' x 6'. A valve controlls the outlet. This is opened about once a year, before the spring rains, to lower the pool slightly. The water flowing in is quite clean, probably because the lake is largely spring-fed and the slopes around the reservoir are wooded. The outlet is a 42" corrugated steel pipe, uncoated. It discharges along the south abutment ridge, about 300' below the dam. The discharge has carved out a plunge pool by washing of a hard clay-shale about 3 ft below the ground surface. There is no significant erosion of the outlet channel. About 30' east of the discharge, a sink-hole has developed, apparently just above the pipe. An auger hole bored here showed a sandy clay for about 2-1/2 ft, when it hit wood. There was water at the bottom of the hole. No leakage was found between the pipe and the soil near the discharge. The pipe has spiral corrugations with a friction fit at the joints, and the sink hole probably developed from leakage at one of these joints.

Crest. The crest was paced as 18' wide. An aspahlt-paved road crosses the dam along this crest. The crest is oriented west to east at what is here called the south abutment, then curves at about the center of the dam and runs south to north to the north abutment. The crest is in excellent condition. Freeboard is about 10'.

Upstream Slope. The entire upstream slope has been terraced first below water level, for distances of 10 to 15 ft., by wave action. Water sking contributes significantly to this washing. The slope is very rough and irregular under the grass cover above the terrace. The vertical face that extends 1 to 2' above the water line is being progressively undermined. When the undermining extends 1 or 2 ft under the slope, the soil caves and a tongue of water penetrates the slope.

As this action proceeds, the tongues come together, and form a nearly vertical slope above water. This finally caves and a slide extends back almost to the crest. Animal boreholes are found about 3 ft above water level. Long grass covers the slope back of the slides and vertical slopes, but there are numerous bare spots here. About 300' north of the abutment, the slope has caved and sloughed for about 20' paralled to the axis of the dam. There is a bush at water level just north of this slide. At about 450' north of the abutment, there is a recent slide extending to 2 or 3' below the crest, and about 30' parallel to the axis. Grass-covered chunks of fill were noted at and below the water line. This will soon be a problem. The fill is hard, well compacted and very sandy. Chunks of it placed under water disintegrate completely in two or three minutes. The low permeability of the compacted fill in place limits the speed of disintegration, and this is what has kept the entire upstream slope from cutting back to the crest and beyond. About half way to the bend in the dam, there is a higher bench, 6 to 8' wide, about 2' above water level. This has a steep slope at the back of the bench, which extends within 4 ft (vertically) of the crest. Another such terrace starts 300' to 400' from the bend and extends to the bend. Above this, the sod is stooling. The upstream slope is 1V on 3H, but has eroded to 1V on 2H in places, with limited vertical slopes.

Near the boat dock, which is north of this bend in the dam, the edge of the crest is gullied and eroded. More erosion has occurred along a foot path to the dock. North of the dock, the soil contains water-washed small gravel. The concrete boat landing north of the dock has its steel mat showing. The slopes on both sides of this landing are badly eroded and bare.

North Abutment. It is somewhat difficult to decide when the embankment ends and the knife-shaped spur which forms the abutment begins. This ridge is covered with heavy bush and 8 to 14' trees. Gulleys and bench from old erosion are covered with grass and trees. This condition is similar on both upstream and downstream sides. The actual fill begins near the boat launch mat. At the fill-abutment contact there is a 2' deep gulley on the downstream slope and a badly eroded condition at the toe.

Downstream Slope. The downstream slope is rough, with rills under the grass. The soil in the north part of the slope is a clayey sand belonging to Group SC in the Unified Classification System. Below the light pole on the crest and behind the boat dock, the toe is wet. A wet condition extends to within 10 ft vertically of the crest. Small horizontal holes have been bored, presumably by animals, a small distance into the fill. A little more to the south, free water was showing at the bottom of a gulley near the toe, and the gulley was wet to within 10 to 15' vertically of the crest. A slope slide starts about 15' above the toe, extending southward about 40 ft. Some 50' farther south, the toe is wet and the fill is soft. More horizontal holes bored by animals were noted.

At the next light south on the crest, erosion has occurred along old dozer tracks about midway down the slope. The lower third of the slope shows numerous damp spots. Several jugs have formed in the center of the slope. A little farther south, at about station 12 + 00, the fill is all wet and soft for about 1/3 of the distance from the toe to the crest. At Station 11 + 50 there is a seep about 10' above the toe,

The slope is badly eroded, and the fill is wet and soft over the bottom quarter of the slope. This condition extends to about Station 10 + 00. South of this, the toe is wet and swamp grass and cat tails are growing west of the toe. The slope is generally very rough.

About a quarter of the way from the 1st to the 2nd pole north of the south abutment, another series of seeps was found, extending about 50' to the south. This seep starts about 15' vertically above the toe and 30' below the crest. A gulley extends to within 5 ft of the crest A capillary water line shows on the sides of this gulley, extending at least halfway up the slope. An auger hole was bored in the bottom of this gulley about 55', measured along the slope, from the crest. The gulley is about 2' deep and water in the auger hole was 3' below this. A second auger hole was bored 20 ft along the slope below the first one. The ground was 6' lower, vertically, and water was found 2' below this. About 40' south, a gulley 6 ft deep has formed about a third of the way up the slope. The soil in the bottom of the gulley is damp. The soil is a hard-packed silty sand with chert, and is damp to within 15 ft vertically of the crest. Free water shows at the toe. A major slope slide starts about 100' north of the first pole from the abutment, about 10' below the crest, with a vertical scarp some 3 - 5' high, extending to the pole.

Recommendations. The most serious conditions at this dam are the seepage south of the center of dam and the slide near the south (left) abutment which is undoubtedly caused by this seepage. Because of these conditions, the writer recommends a Phase II study if this dam involves a significant hazard to life. From the standpoint of the owners, such a study appears warranted to protect the considerable investment that has been made here. Cosmetic backfilling is of questionable value

and could result in a worse condition. The Phase II study should include test borings to to assess the underseepage and the condition of the core, tests of the basic soil parameters (frictional and cohesive strength and permeability, at least) and a stability analysis based on the results of this exploration. This Phase I inspection has already established the fact that a substantial amount of the observed seepage comes from seepage through the core, rather than underseepage. Through seepage develops seepage pressures in a direction that substantially decreases the safety factor of the dam against complete failure of the dam at the downstream slope. The large slope failure now visible near the left abutment is the first stage in such a failure. The excellent compaction of the fill has prevented complete failure, but as apparent cohesion is reduced by saturation and seepage pressures increase, the prognosis for the downstream slope is poor.

The upstream slope will eventually become a problem, but thanks to the good compaction, some time should elapse before erosiun reaches the road. During a Phase II investigation, consideration should be given to alternative methods of repairing this slope. A most inexpensive way of alleviating the erosion problem is to drain down the lake 3 or 4 feet, bring the slopes back to 1 on 3 with well-compacted fill, develop a good Bermuda grass or other protective sod, and stop water-sking on the lake.

The outlet pipe back of the discharge pipe should be exposed beyond the sink hole that has developed over it, the leak in the pipe repaired and a soil cement backfill placed immediately around the pipe with a well-compacted backfill above it.

PAGE 7

GROUND VALLEY DAM NO. 1

Report Submitted 4/18/81,

F. H. Kellogg, P. E.
Registered Tenn. #3760

FHK:lc

APPENDIX E

HYDRAULIC AND HYDROLOGIC DATA

HYDRAULICS AND HYDROLOGIC CALCULATIONS

Grand Valley Dam No. 1 is located in Hardeman County, Tennessee. The present land use is estimated to be 32 percent woodland, 49 percent open land, and 19 percent water. The soil group is Memphis-Loring-Lexington and is classified as a "B" soil. The runoff curve number was calculated to be 68 AMC II.

The Grand Valley Dam No. 1 is an intermediate size, high hazard potential dam. As such, it is required to pass the full PMF without overtopping. Using the U.S. Weather Service TP-40, the 6-hour PMP was estimated to be 29.7 inches yielding 24.72 inches runoff (RCN 68 AMC II). The ½ PMF which is derived from the Probable Maximum Precipitation was routed with a 12.36 inch runoff (RCN 68 AMC II).

The total inflow into the reservoir is about 1512 acre-feet with a maximum peak of 10,300 cfs and a routed peak discharge of 5400 cfs. Grand Valley Dam No. 1 reservoir has a maximum storage from the crest of the service spillway to the top of the dam of 492 acre-feet and a maximum spillway (service spillway only) discharge rate of 83 cfs. The impoundment is insufficient to safely pass the PMF and would overtop the dam a maximum of four feet with flows lasting in excess of nine hours.

The 6-hour, 100-year flood containing 5.5 inches precipitation was routed through dams 1 and 2 using a RCN of 84 (AMC III). This produced a runoff of 3.73 inches and a routed peak discharge of 1177 cfs. Grand Valley Dam No. 1 contained the storm with flows of 2.9 feet above the crest of the service spillway and a freeboard of 2.2 feet.

The 1-10 day, 100-year storm was routed through the structure and did not produce flow over the top of the dam.

The inflow hydrograph was calculated by methods contained in Section 4, Chapter 21 of the SCS National Handbook. Weir constants in the formula $Q=CLH^{3/2}$ were found in King and Brater "Handbook of Hydraulics", fifth edition. The routing equation used was:

$$I_1 + I_2 + \left(\frac{2S_1}{\Delta t} - O_1\right) = \left(\frac{2S_2}{\Delta t} + O_2\right) .$$

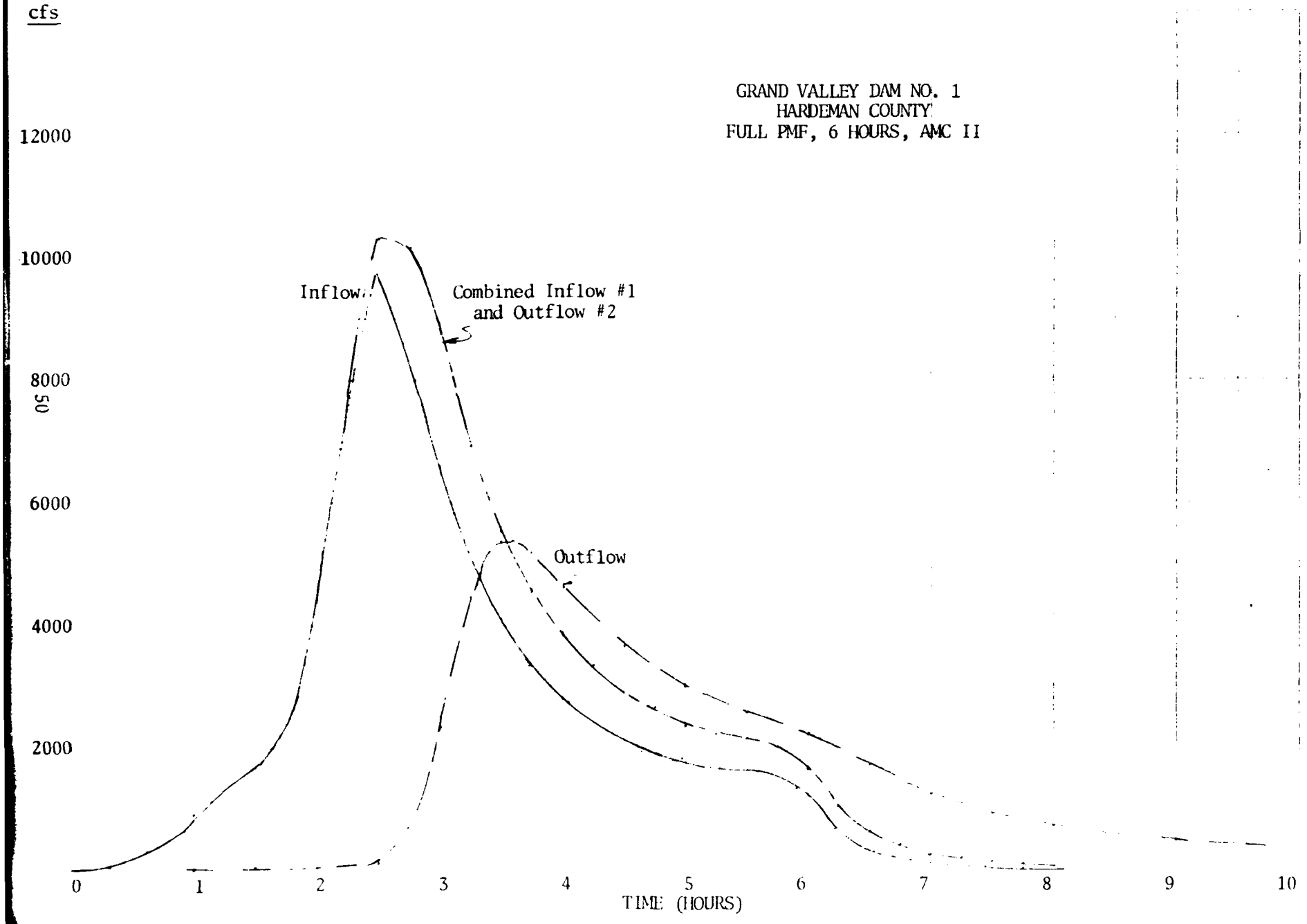
Basic Engineering Data was obtained from the following sources: Engineering surveys of the impoundment structure; U.S. Geologic Survey Topographic Maps; Aerial photographs; USDA Soil Conservation Service Soil Survey Maps; Rainfall Data and Hazard Classification from the Tennessee Division of Water Resources.

HYDRAULIC AND HYDROLOGIC SUMMARY

Frequency of Occurrence	Duration	Antecedent Moisture Condition II	III
100-year	6-hour	Will Pass	Will Pass
100-year	10-day	2/	
½ PMF[1]	6-hour	Will Overtop 1.9 ft. for 8.5 hours	Will Overtop 2.1 ft. for 8.6 hours
PMF	6-hour	Will Overtop 4 ft. for 9 hours	Will Overtop 4.1 ft. for 9.2 hours

[1]Probable Maximum Flood

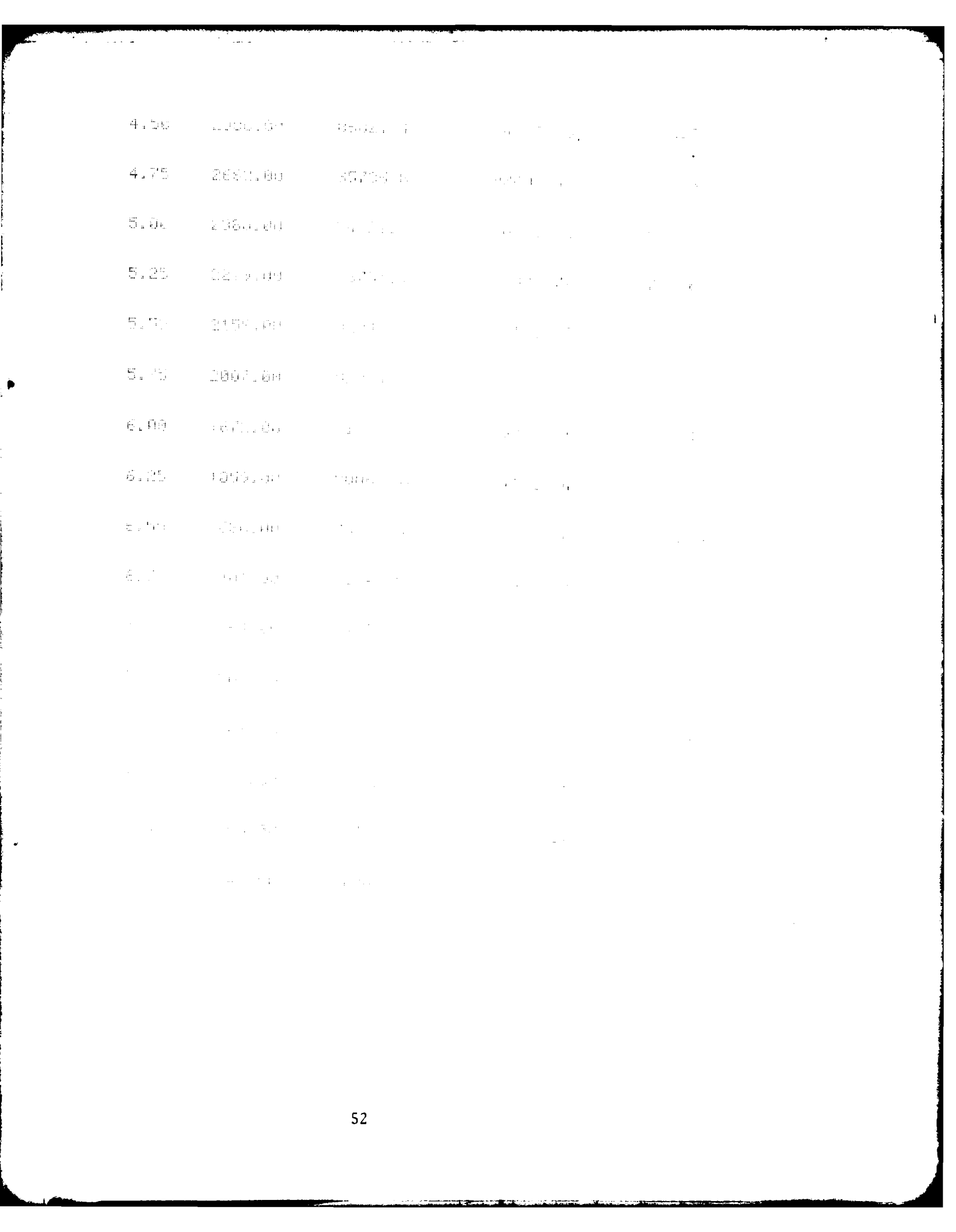
[2]Did not produce flow over top of dam


cfs
GRAND VALLEY DAM NO. 1
HARDEMAN COUNTY
FULL PMF, 6 HOURS, AMC II
12000
10000
8000
6000
4000
2000
Inflow
Combined Inflow #1
and Outflow #2
Outflow
0
1
2
3
4
5
6
7
8
9
10
TIME (HOURS)

NAME OF DAM =GRAND [illegible]

STORM=FULL PMF, 6 hour [illegible]
TIME INCREMENT IN HOURS = [illegible]

TIME	I (CFS)	[illegible]
0.00	0.00	[illegible]
0.25	102.60	[illegible]
0.50	204.60	[illegible]
0.75	45[illegible]	[illegible]
1.00	51[illegible]	[illegible]
1.25	[illegible]	[illegible]
1.50	[illegible]	[illegible]
1.75	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]



FULL PMF, 6 HOURS, AMC II

HYDROGRAPH COMPUTATION

DATE _____
COMPUTED BY _____
CHECKED BY _____

Project Grand Valley No. 1

DR. AREA 1.15 SQ. MI. STRUCTURE CLASS _____

T_c 0.93 HR. STORM DURATION 6 HR.

POINT RAINFALL 29.7 IN.

ADJUSTED RAINFALL:

AREAL : FACTOR _____ IN. _____

DURATION : FACTOR _____ IN. _____

RUNOFF CURVE NO. 68

Q 24.72 IN.

HYDROGRAPH FAMILY NO. 1

COMPUTED T_p 0.65 HR.

T_o 5.55 HR.

(T_o / T_p)

COMPUTED 8.54 ; USED 10

REVISED T_p 0.555

$q_p = \frac{484A}{REV.\ T_p}$ = 1002.88 CFS.

$(Q)(q_p)$ = 24791.26 CFS.

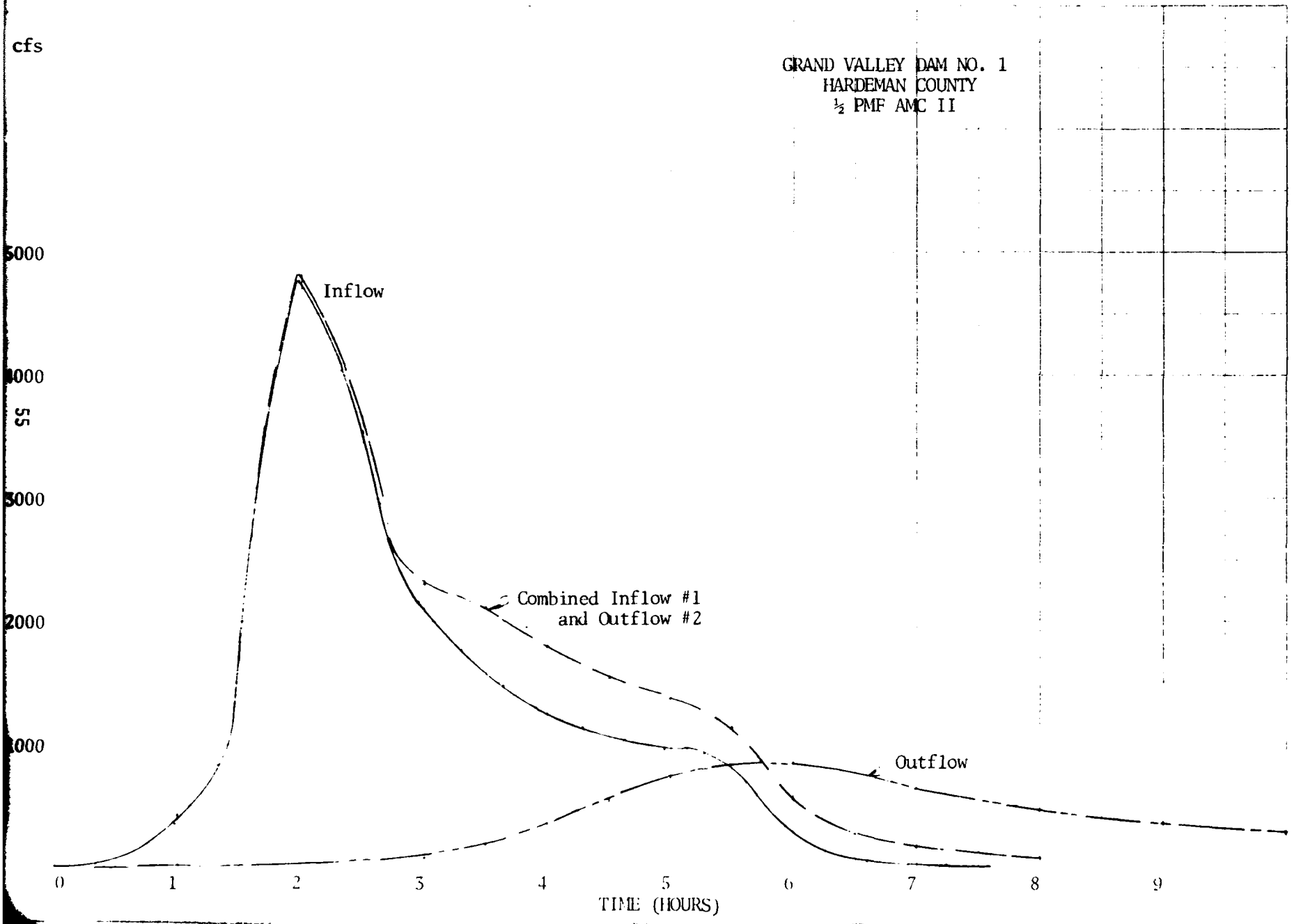
t(COLUMN) = (t / T_p) REV. T_p q(COLUMN) = $(q_c / q_p)(Q)(q_p)$

Q(COLUMN) = $(Q_t / Q)Q$

	$t=(t/T_p)$Rev. T_p t HOURS	$q=(q_c/q_p)(Q)(q_p)$ q CFS	$Q_t=(Q_t/Q)Q$ Q INCHES
1	0	0	0
2	.31	50	
3	.62	322	
4	.93	669	
5	1.24	1165	
6	1.55	1760	
7	1.86	2851	
8	2.18	6892	
9	2.49	9768	
10	2.80	7983	
11	3.11	5826	
12	3.42	4314	
13	3.73	3372	
14	4.04	2727	
15	4.35	2281	
16	4.66	1959	
17	4.98	1810	
18	5.28	1686	
19	5.59	1611	
20	5.91	1314	
21	6.22	669	
22	6.53	297	
23	6.84	149	
24	7.15	74	
25	7.46	50	
26	7.77	25	
27	8.00	0	
28			
29	check: 59624 (.31)		= 24.92"
30	645 (1.15)		
31			
32			
33			
34			

Winsett-Simmonds, Considine & Associates, Inc.
821 SOUTH BARKSDALE STREET P O BOX 10045 MEMPHIS, TENNESSEE 38104
TELEPHONE 901 274-8400
Systems Engineers

46 0780


cfs
GRAND VALLEY DAM NO. 1
HARDEMAN COUNTY
½ PMF AMC II
5000
4000
55
3000
2000
1000
Inflow
Combined Inflow #1
and Outflow #2
Outflow
0
1
2
3
4
5
6
7
8
9
TIME (HOURS)

4.50	1522.00	[illegible]	[illegible]	[illegible]
4.75	1416.00	[illegible]	[illegible]	[illegible]
5.00	1366.00	[illegible]	[illegible]	[illegible]
5.25	1262.00	[illegible]	[illegible]	[illegible]
5.50	1131.00	[illegible]	[illegible]	[illegible]
5.75	[illegible]	[illegible]	[illegible]	[illegible]
6.00	[illegible]	[illegible]	[illegible]	[illegible]
6.25	[illegible]	[illegible]	[illegible]	[illegible]
6.50	[illegible]	[illegible]	[illegible]	[illegible]
6.75	[illegible]	[illegible]	[illegible]	[illegible]
7.00	[illegible]	[illegible]	[illegible]	[illegible]
7.25	[illegible]	[illegible]	[illegible]	[illegible]
7.50	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8.00	[illegible]	[illegible]	[illegible]	[illegible]
8.25	[illegible]	[illegible]	[illegible]	[illegible]
8.50	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

½ PMF AMC II

HYDROGRAPH COMPUTATION

DATE May 15, 1981
COMPUTED BY BFS
CHECKED BY

Project GRAND VALLEY DAM NO. 1

DR. AREA 1.15 SQ. MI. STRUCTURE CLASS

T_c 0.93 HR. STORM DURATION 6 HR.

POINT RAINFALL 16.94 IN.

ADJUSTED RAINFALL:

AREAL : FACTOR IN.

DURATION : FACTOR IN.

RUNOFF CURVE NO. 68

Q 12.36 IN.

HYDROGRAPH FAMILY NO. 2

COMPUTED T_p 0.65 HR.

T_o 5.24 HR.

(T_c / T_p):
COMPUTED 8.06 ; USED 10

REVISED T_p 0.524

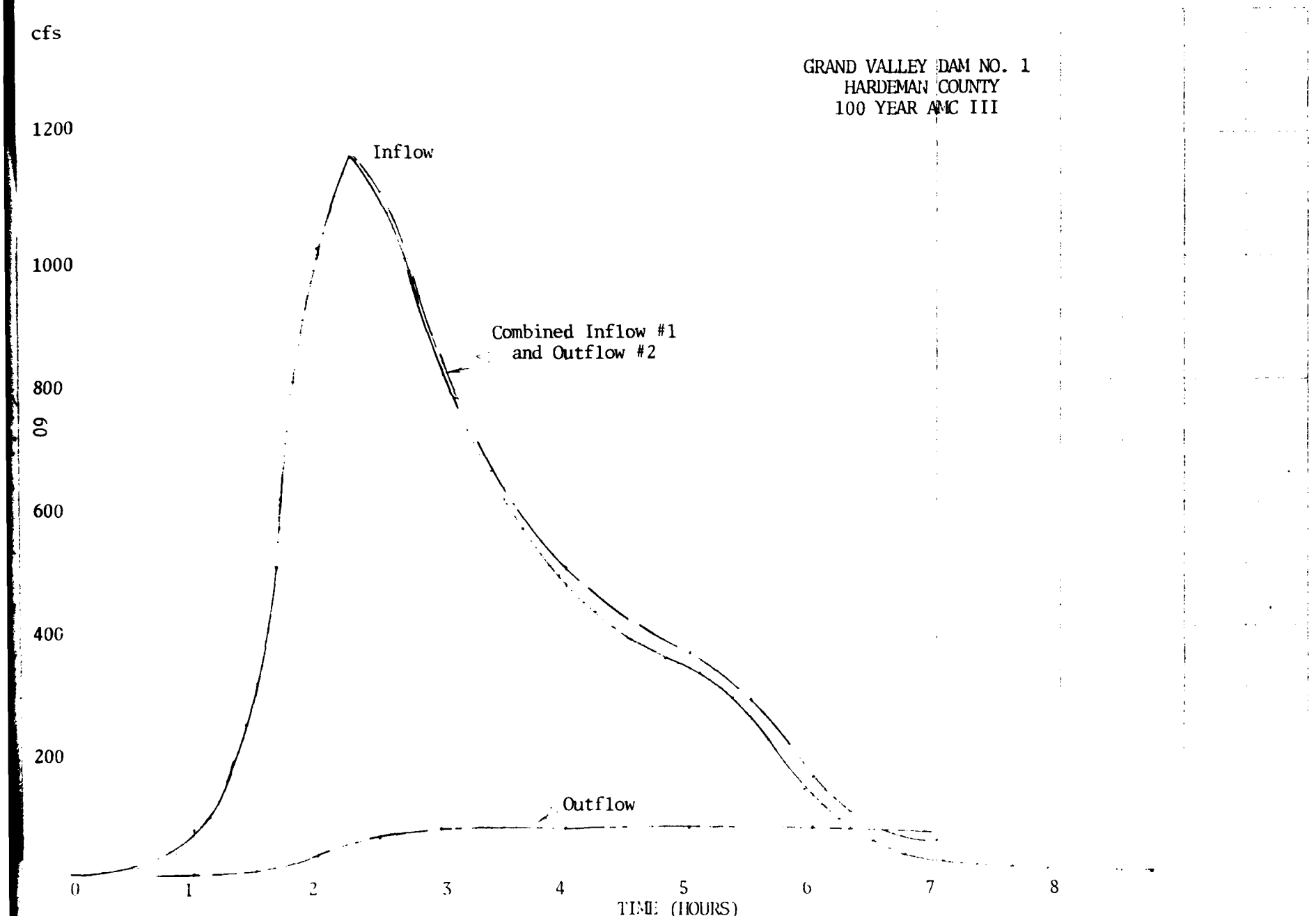
$q_p = \frac{484A}{\text{REV. } T_p} = 1062.2$ CFS.

$(Q)(q_p) = 13128.96$ CFS.

t(COLUMN) = (t / T_p) REV. T_p q(COLUMN) = $(q_c / q_p)(Q)(q_p)$

Q(COLUMN) = $(Q_t / Q)Q$

	$t=(t/T_p)$Rev. T_p	$q=(q_c/q_p)(Q)(q_p)$	$Q_t=(Q_t/Q)Q$
	t HOURS	q CFS	Q INCHES
1	0	0	0
2	.33	26	
3	.66	118	
4	.99	354	
5	1.32	827	
6	1.65	3098	
7	1.98	4779	
8	2.31	4031	
9	2.64	2967	
10	2.97	2258	
11	3.30	1786	
12	3.63	1484	
13	3.96	1274	
14	4.29	1116	
15	4.62	1024	
16	4.95	972	
17	5.28	906	
18	5.61	696	
19	5.94	328	
20	6.27	118	
21	6.60	53	
22	6.93	26	
23	7.26	13	
24	7.59	0	
25			
26	check: 28254 (.33)		= 12.57"
27		645 (1.15)	
28			
29			
30			
31			
32			
33			
34			


cfs
GRAND VALLEY DAM NO. 1
HARDEMAN COUNTY
100 YEAR AMC III
1200
1000
800
600
400
200
Inflow
Combined Inflow #1
and Outflow #2
Outflow
0
1
2
3
4
5
6
7
8
TIME (HOURS)

NAME OF DAM =GRAND VALLEY #4

STORM=100 YEAR - 6 HOUR= RAP
TIME INCREMENT IN HOURS = 0.

TIME	I (CFS)	[illegible]	[illegible]	[illegible]
0.00	0.00	[illegible]	[illegible]	0.00
0.25	4.00	[illegible]	[illegible]	[illegible]
0.50	15.00	[illegible]	[illegible]	[illegible]
0.75	31.00	[illegible]	[illegible]	[illegible]
1.00	75.00	[illegible]	[illegible]	[illegible]
1.25	151.00	[illegible]	[illegible]	[illegible]
1.50	[illegible]	[illegible]	[illegible]	[illegible]
1.75	[illegible]	[illegible]	[illegible]	[illegible]
2.00	[illegible]	[illegible]	[illegible]	[illegible]
2.25	[illegible]	[illegible]	[illegible]	[illegible]
2.50	[illegible]	[illegible]	[illegible]	[illegible]
2.75	[illegible]	[illegible]	[illegible]	[illegible]
3.00	[illegible]	[illegible]	[illegible]	[illegible]
3.25	[illegible]	[illegible]	[illegible]	[illegible]
3.50	[illegible]	[illegible]	[illegible]	[illegible]
3.75	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

100 YEAR AMC III

HYDROGRAPH COMPUTATION

DATE May 15, 1981
COMPUTED BY BFS
CHECKED BY

Project GRAND VALLEY DAM NO. 1

DR. AREA 1.15 SQ. MI. STRUCTURE CLASS

T_c 0.93 HR. STORM DURATION 6 HR.

POINT RAINFALL 5.5 IN.

ADJUSTED RAINFALL:

AREAL : FACTOR IN.

DURATION : FACTOR IN.

RUNOFF CURVE NO. 84

Q 3.73 IN.

HYDROGRAPH FAMILY NO. 2

COMPUTED T_p .65 HR.

T_o 5.0 HR.

(T_c / T_p)

COMPUTED 7.69 ; USED 6

REVISED T_p .83

$q_p = \frac{484A}{\text{REV. } T_p} =$ 670.60 CFS.

(QXq_p) = 2501.35 CFS.

t(COLUMN) = (t / T_p) REV. T_p q(COLUMN) = $(q_c / q_p X Q X q_p)$

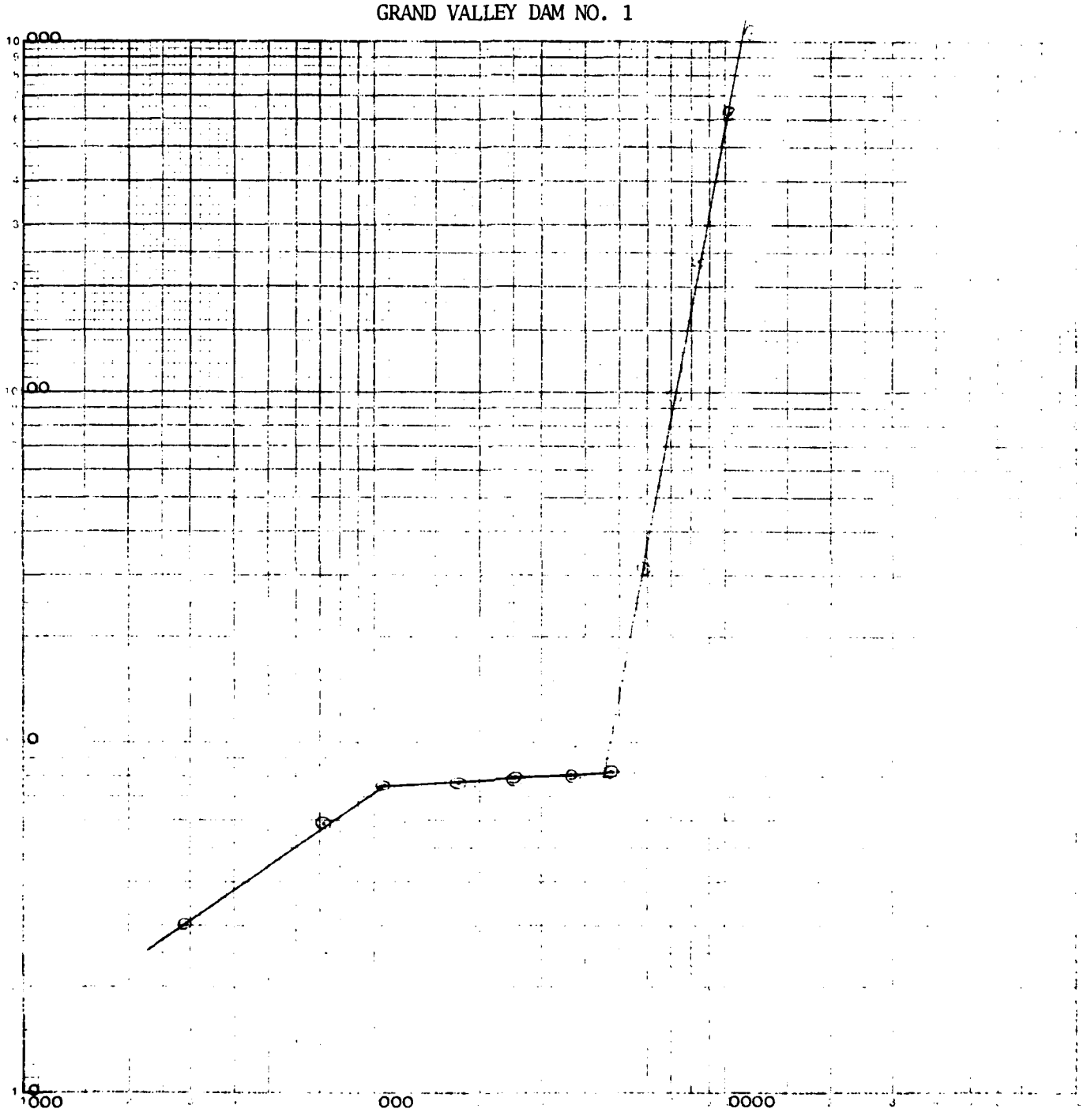
Q(COLUMN) = $(Q_t / Q)Q$

	$t=(t/T_p)$Rev. T_p	$q=(q_c/q_p)XQXq_p$	$Q_t=(Q_t/Q)Q$
	t HOURS	q CFS	Q INCHES
1	0	0	0
2	.28	3	
3	.56	13	
4	.85	38	
5	1.13	93	
6	1.41	245	
7	1.69	610	
8	1.98	1018	
9	2.26	1161	
10	2.54	1073	
11	2.82	918	
12	3.10	773	
13	3.39	653	
14	3.67	560	
15	3.95	483	
16	4.23	423	
17	4.52	380	
18	4.80	348	
19	5.08	323	
20	5.36	283	
21	5.64	215	
22	5.93	138	
23	6.21	88	
24	6.49	50	
25	6.77	30	
26	7.06	20	
27	7.34	13	
28	7.62	10	
29	7.90	8	
30	8.18	5	
31	8.47	3	
32	8.75	0	
33			
34	check: 9978 (.28) / 645 (1.15)		= 3.771

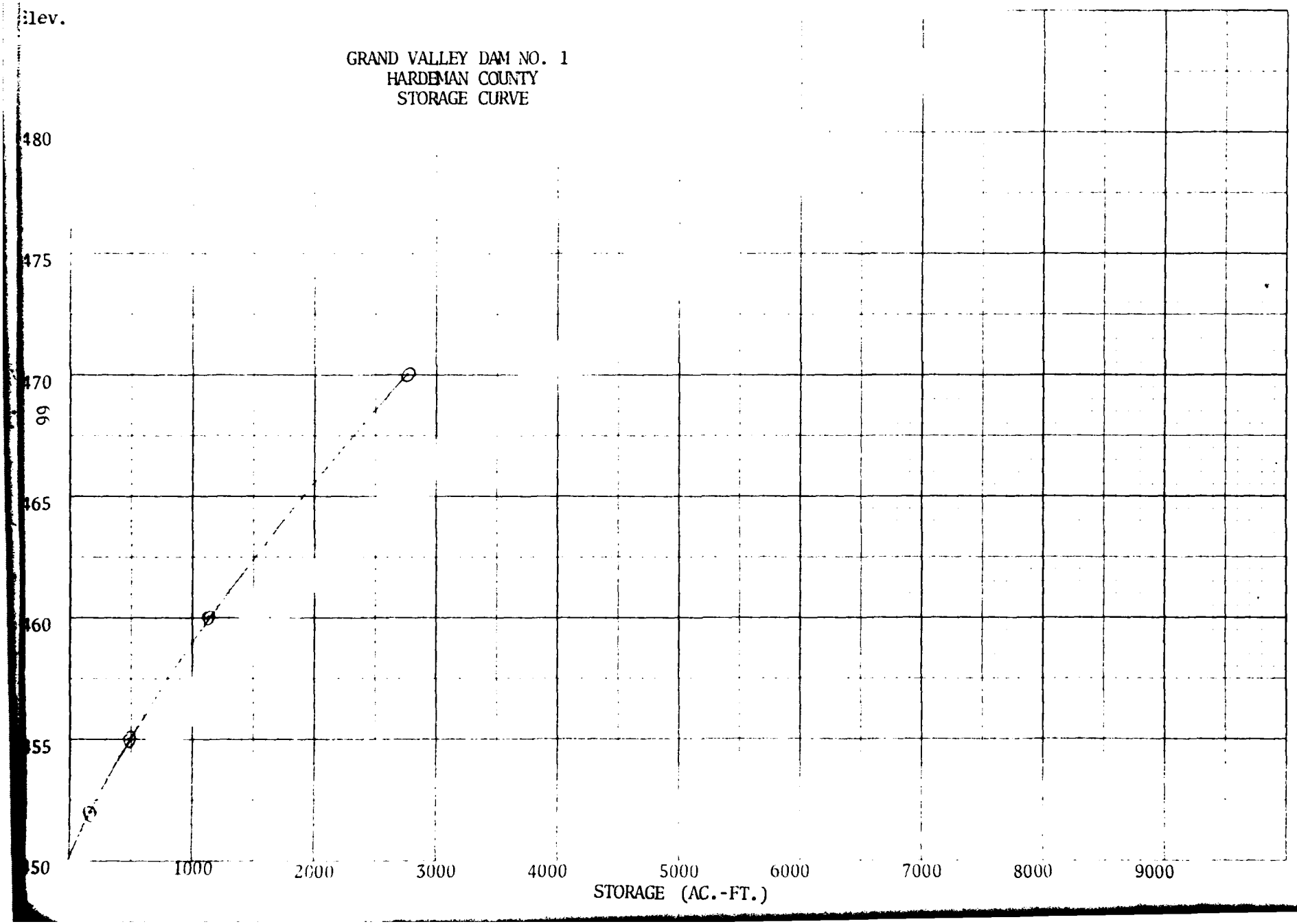
Winsett-Simmonds, Considine & Associates, Inc.
621 SOUTH BARKSDALE STREET P.O. BOX [illegible] MEMPHIS, TENNESSEE 38104
TELEPHONE 901 274-6400

Systems Engineers

STORAGE INDICATION CURVE
GRAND VALLEY DAM NO. 1

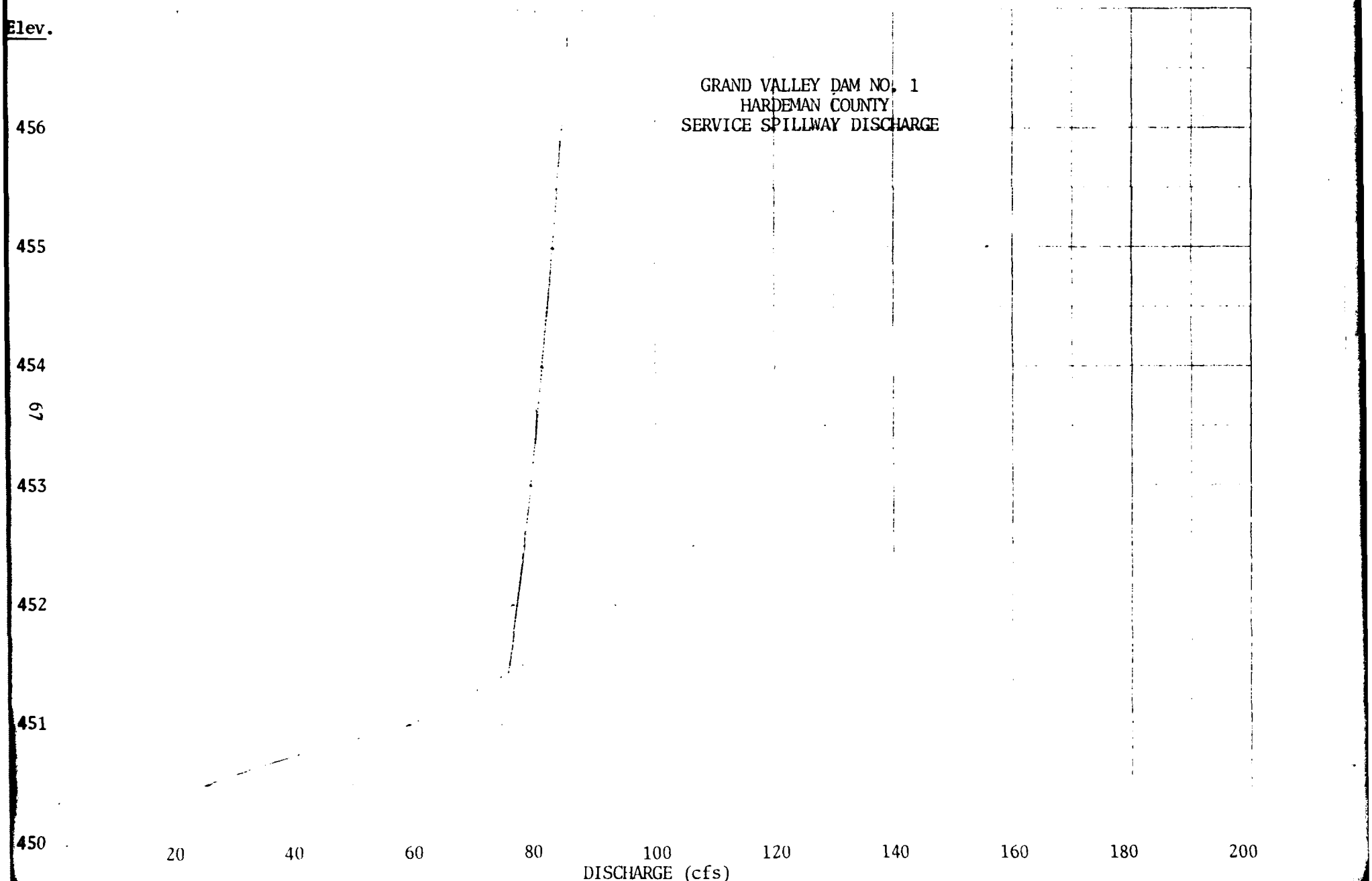


46 0780

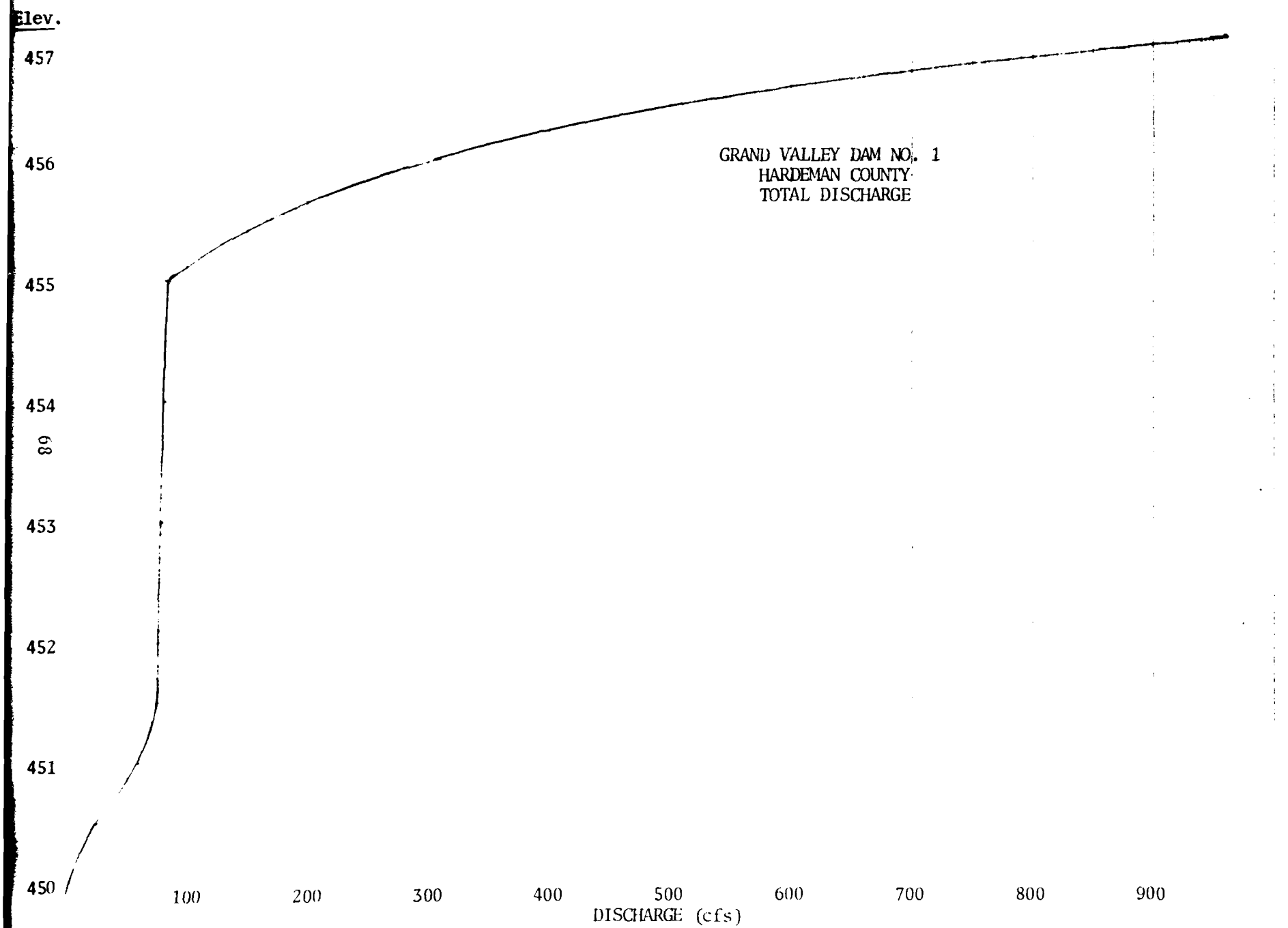

Elev.
GRAND VALLEY DAM NO. 1
HARDEMAN COUNTY
STORAGE CURVE
480
475
470
465
460
455
450
1000
2000
3000
4000
5000
6000
7000
8000
9000
STORAGE (AC.-FT.)

POWER CURVE FIT EQUATION

46 0780



GRAND VALLEY DAM NO. 1
HARDEMAN COUNTY
SERVICE SPILLWAY DISCHARGE


Elev.
457
456
455
454
453
452
451
450
GRAND VALLEY DAM NO. 1
HARDEMAN COUNTY
TOTAL DISCHARGE
100
200
300
400
500
600
700
800
900
DISCHARGE (cfs)

APPENDIX F

DAM INVENTORY DATA SHEET

AND

CORRESPONDENCE

DAM INVENTORY DATA SHEET
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

ID NUMBERS STATE(ID): 35-7024 FEDERAL(FED ID): TN-07024

NAME(PROJECT): Grand Valley Lake #1 REGION(R): West

OWNER(S): Grand Valley Property Owner's Assn (Dwayne Williams, Pres.)

ADDRESS: P.O. Box 94, Hickory Valley, TN 38042

TELEPHUNE RESIDENCE: BUSINESS: 37[illegible]

COUNTY: Hardeman QUAD: [illegible]

LOCATION LATITUDE: 35° 09' 04", LONGITUDE: 89° 01' [illegible]"

STREAM(SOURCE): Gin Pond Branch RIVER MILE: BASIN: [illegible]

PURPOSE OF DAM: Recreation YEAR COMPLETE: 19[illegible] ±

CONTRACTOR(CONT): LOCATION:

ENGINEER(ENG): LOCATION:

TYPE OF DAM(TYP): Earth SIZE CLASSIFICATION: [illegible]

DOWNSTREAM HAZARD POTENTIAL CLASSIFICATION STATE(H) 1 FEDERAL(FH) [illegible]

CERTIFICATE EXPIRATION DATE(EXP DATE):

STRUCTURAL HEIGHT(SHT): 36.7 FEET, HYDRAULIC HEIGHT(HHT): 24.7 FEET

CREST LENGTH(LENG): [illegible] FEET, CREST WIDTH(WIDTH): [illegible] FEET

UPSTREAM SLOPE(U/S): 3.0:1, DOWNSTREAM SLOPE (D/S): 3.0:1

POOL AREA NORMAL(NORM): [illegible] ACRES, MAXIMUM(M/SURF): [illegible]

	ELEVATION(FEET MSL),	STORAGE CAPACITY(ACRE-FEET)
TOP OF DAM	(ELEV1) 457.0,	(TO/STR) [illegible]
EMERGENCY SPILLWAY CREST	(ELEV2) 455.6,	(EM/STR) [illegible]
NORMAL POOL	(ELEV3) 432.3,	(N/STR) [illegible]

EMERGENCY SPILLWAY MATERIAL(ESM): Asphalt, SIZE(SZ) [illegible]

SERVICE SPILLWAY MATERIAL(SSM): CMP, SIZE(SZ) [illegible]

DRAINAGE AREA(DA): [illegible] SQ. MILES, CURVE NUMBER(CN): [illegible]

TIME OF CONCENTRATION(TC): HOURS, MAXIMUM 6-HR RAIN: [illegible]

COMMENTS: INVENTORIED BY: Staff DATE:

REVISED DATA: REINSPECTION DATE: 6/8/[illegible] D/S HAZARD (H): [illegible] DATE:

OTHER NAME OF PROJECT: POOL AREAS OBTAINED BY:

OTHER OWNER'S NAME: PHONE:

DATA OBTAINED FROM: Field [illegible]; Book [illegible]

EMER. SPIL. DESC.: Trapezoidal channel 20' bot w; 3:1 [illegible]

SERV. SPIL. DESC.:

ELEVATIONS REF. TO: APPROX ELEV: [illegible] FT MSL

DRAWDOWN DRAIN: MATERIAL: Iron SIZE: ELEVATION:

OTHER COMMENTS:

Tennessee Department of
Conservation Division of Water Resources
RAY BLANTON - GOVERNOR
B R.ALLISON - COMMISSIONER
6213 Charlotte Ave(Suite 107) Nashville,Tennessee 37209 (615)741-1281
ROBERT A. HUNT DIRECTOR

October 1, 1975

Grand Valley Lakes Development
5573 Popular Avenue
Suite 510
Memphis, TN 38117

Gentlemen:

A field inspection of the main dam at Grand Valley Lakes in Hardeman County was recently made by myself and other staff members. The conditions observed warrant immediate action by the owner to determine the stability and safety of the earthen dam.

Near the center of the dam severe erosion combined with underseepage indicate that serious problems are developing and a dangerous situation is being created. Continued deterioration could cause sudden failure of the dam.

Under the provisions of the Tennessee Safe Dams Act, we are requesting the owners of the Grand Valley Dam to immediately engage the services of a competent engineering firm experienced in the evaluation of dams to conduct tests and studies to determine what corrective measures are needed. Their report and recommendations must be submitted to our agency for review and approval and a Certificate of Approval and Safety issued in advance of any corrective action. Enclosed for your information are copies of the Act and applied rules.

I shall be glad to meet with you and/or others to further discuss the situation. However, we do urge you to proceed as rapidly as possible to comply with the above requests and to inform us of your action at the earliest possible date.

Very truly yours,

Robert A. Hunt
Director

RAH:jp

cc: Mr. O'Neal
Regional Engineer

Enclosures 2

Date 12/5/75 Region WEST

INSPECTION REPORT

Name of Dam: GRAND VALLEY # 1 County HARDEMAN

Owners Name: GVL INC. Quad. 432NE

Type Project: Existing ✓ Application No. 432NE
New Construction
Repair/Alteration
Removal

Type Inspection: Stage I
Stage II
Certificate
Cursory ✓
Preliminary Site Review

Damage Potential Category: One ____ Two ____ Three ____ Undetermined ✓

Inspection by: Ed Offield

Inspection Results:

NO SIGN OF ACTIVITY. EROSION ON BACKSLOPE IS CONTINUING. NO DIKE CHANGE SINCE LAST INSPECTION

Date 9/4/77 Region WEST

INSPECTION REPORT

Name of Dam: GOOSE VALLEY CAVE County HARDEMAN

Owners Name: COE Quad. _____

Type Project: Existing ✓ Application No. _____
New Construction _____
Repair/Alteration _____
Reroval _____

Type Inspection: Stage I _____
Stage II _____
Certificate _____
Cursory ✓
Preliminary Site Review _____

Damage Potential Category: One _____ Two _____ Three _____ Undetermined ✓

Inspection by: [illegible]

Inspection Results:

COE CHECK - RETURN DRY SEASON TO BE SURE - EROSION HAS

Date MAR 12 79 Region WEST

INSPECTION REPORT

Name of Dam: GRAND VALLEY LAKES County: HARDEMAN

Owner's Name: D WILLIAMS PRES PROPERTY OWNERS ASSOC. Quad: _____

Type Project: Application No. _____

Existing	✓
New Construction	
Repair/Alteration	
Removal	

Type Inspection:

Phase I	
Phase II	
Certificate	
Cursory	✓
Preliminary Site Review	

Phase I Reconnaissance _____

Damage Potential Category: One ___ Two ___ Three ___ Undetermined ___

Inspection by: [illegible] & ED O'NEAL

Inspection Results:

[illegible] SEEPAGE ALONG THE D/S SLOPE COMBINED WITH SEEPAGE AND/OR SPRINGS ON THE [illegible] AT THE DAY OF INSPECTION. THE FOLLOWING COURSE OF [illegible] HAVE BEEN AGREED UPON BY THE DEVELOPER AND THE REPRESENTATIVES OF [illegible] AND OTHER PERSONS PRESENT AT THE INSPECTION:

1. [illegible] EXISTING DRAINAGE FILTER SYSTEM IS TO BE WATERED DOWN AND ALL VOIDS ARE TO BE FILLED WITH SUITABLY COMPACTED MATERIAL.

2. ADEQUATE TO PREVENT FURTHER EROSION [illegible] GRASS COVER IS TO BE ESTABLISHED ON THE D/S SLOPE.

3. [illegible] ANDERSON P.E., BOLIVAR TN. IS TO DESIGN AND SUPERVISE [illegible] REQUIRED FOR COMPLETION OF THE ABOVE RECOMMENDATIONS.

4. [illegible] LETTER OF MAR 14 79 DOCUMENTS THOSE AGREEMENTS.

THE FOLLOWING IS SUGGESTED BUT NOT REQUIRED AT THIS TIME:

1. CONSTRUCTION OF A FILL OR PARTIAL WAVE BREAK FENCE TO STOP EROSION [illegible]

2. CONSTRUCTION OF A BERM ON THE D/S SLOPE TO HELP STOP EROSION.

Tennessee Department of
Conservation Division of Water Resources
LAMAR ALEXANDER - GOVERNOR
Ann R. Tuck - Commissioner
6213 Charlotte Ave. (Suite 107) Nashville, Tennessee 37209 (615) 741-1281
ROBERT A. HUNT, DIRECTOR

Box 42
Jackson State Office Bldg.
225 Madison Avenue
Jackson, TN 38301
March 14, 1979

Mr. Dwayne Williams 076-0632
P.O. Box 94
Hickory Valley, TN 38042

Re: Grand Valley Lakes - Main Dam, Hardeman County

Dear Mr. Williams:

The purpose of this letter is to provide documentation of the agreements reached at our meeting of March 12 on the Grand Valley Lakes Dam. The following people were in attendance: John Browning, Developer; Walter Anderson, P.E.; Dwayne Williams, President of Homeowner's Association; Wayne Smith, Officer in the Homeowner's Association; George Moore and Ed O'Neill of the Division of Water Resources.

Erosion on the downstream slope of the dam is becoming severe. The erosion appears to be caused by seepage through the dam and/or from surface runoff. The flows associated with the erosion gullies and those especially noticeable on the right abutment are either seepage through the dam or spring flows.

We think the dam has obvious, serious deficiencies which clearly could develop into failure modes; however, there does not yet appear to be a threat of imminent failure. Remedial work should begin as soon as working conditions permit. It was generally agreed that an embankment drainage system should be installed on the dam. After installation of this system, the gullies should be filled with suitable compacted material and a soil binding grass established on the dam. Design and supervision of construction of the drainage system is to be done by Walter Anderson, P. E., Bolivar, Tennessee. The point was stressed that this action may not completely alleviate the problem but in our opinion it does represent a reasonable course of action especially in view of the unanimous appeal to hold down costs.

It will be necessary for the Property Owner's Association to file an application for repair of the dam along with plans

and specifications. Forms are enclosed for this purpose and should be signed by Dwayne Williams, President, Property Owner's Association and returned accompanied by plans and specifications. Our approval of these plans and specifications will be required before construction is begun.

May we assure you of our interest in Grand Valley Lakes and we will be glad to meet with you again should the need arise.

Sincerely yours,

Edmond B. O'Neill
Chief Engineer

EBO:lg

Enclosures

cc: Walter Anderson

TENNESSEE DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES
Suite 402-A, Box 42
225 Madison Avenue
Jackson, Tennessee 38301
901/424-3051

February 27, 1980

Mrs. Helen King
28 Manley Drive
Jackson, TN 38301

Re: Grand Valley Lakes Dam - Hardeman County

Dear Mrs. King:

Enclosed is a copy of our last correspondence with Grand Valley Lakes. So far as I know, the conditions still exist. We have had numerous meetings with personnel associated with Grand Valley Lakes during the past several years; however, no action ever results.

The agreements reached in our March 14, 1979, letter represent a reasonable approach to the problem, and I advise you to take prompt action on this matter. An application for a Certificate to repair the dam is enclosed.

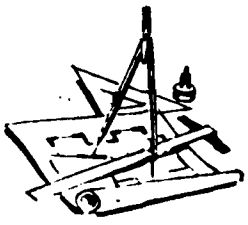
Sincerely,

Edmond B. O'Neill
Chief Engineer

EBO:lt

Enclosures

AC (901) 658-6939
HOME 6010



WALTER L. ANDERSON, P.E.
CONSULTING ENGINEER
POST OFFICE BOX 88
BOLIVAR, TENNESSEE 38008

16 July 1980

Tennessee Department of Conservation
Division of Water Resources
Jackson, Tennessee, 38301

ATTN: Edmond B. O'neill

Re: Grand Valley Lakes Dam No. 1

Dear Mr. O'Neill

The following is my observation of the above captioned dam. No drilling was performed.

The back slope of the dam is experiencing sever surface erosion. This appears to be because the back slope was constructed with a sandy soilwith very little cohesive material and probably loosely compacted. The eroded areas will have to be repaired and reseeded.

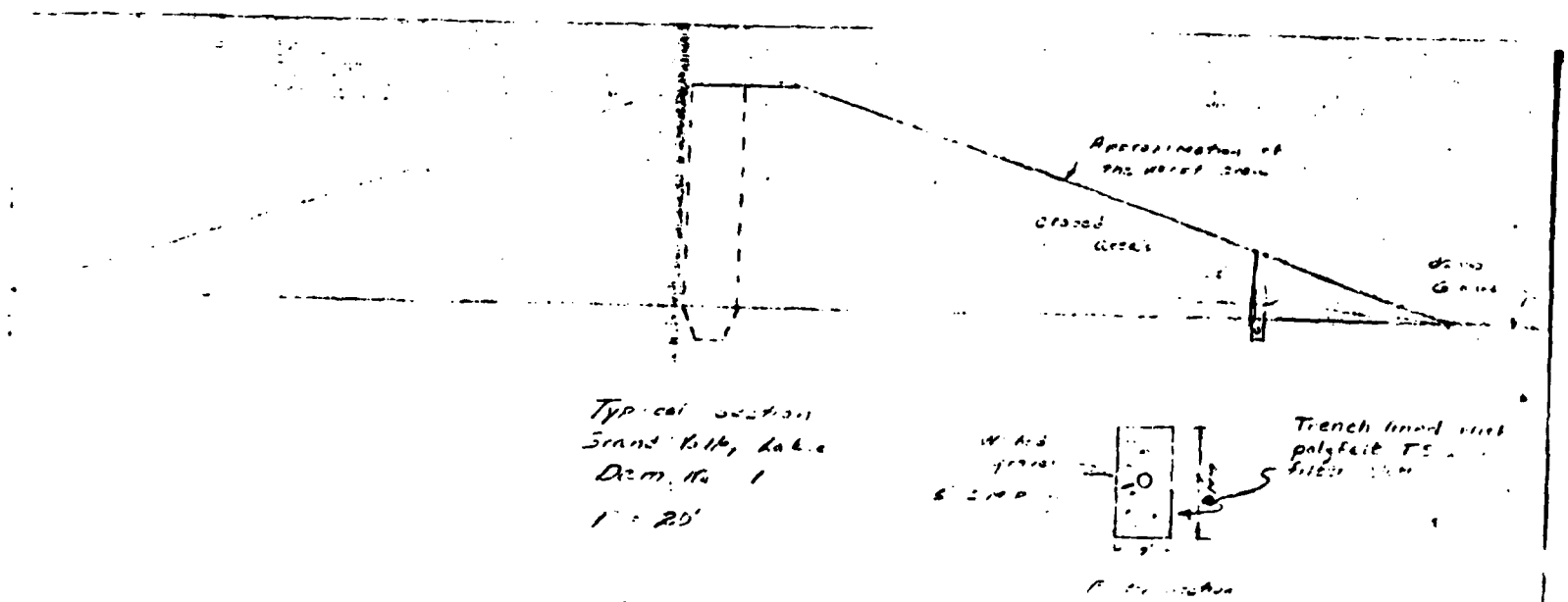
There is also a problem of underseepage. At the time of construction, an impervious clay core was installed. The core appears to be working satisfactorily. Even in the most severely eroded areas, there is no sign of seepage flow exiting in the backslope. However, there are some spring like areas at the base of the toe and a good bit of the area immediately below the toe is damp, even after this long dry spell. It would appear that the top flow line is under the core then approximately along the base of the dam.

Mr. Browning would like to install a filter system of clean washed gravel, a 6" bituminous coated, perforated CM pipe, wrapped in a polyfelt T.S. 200 filter cloth. The approximate location would be as shown on the accompanying sketch. However the actual location would be determined by field observation.

Thank you

Sincerely Yours,

Walter L. Anderson



Typical section
Grand Valley, Colo.
Dam No. 1
1" = 20'

AC (901) 658-6939

WALTER L. ANDERSON, P.E.
CONSULTING ENGINEER
POST OFFICE BOX 88
BOLIVAR, TENNESSEE 38008

July 18, 1980

Tennessee Department of Conservation
Division of Water Resources
Jackson, Tennessee 38301

ATTN: Edmond B. O'Neill

Re: Grand Valley Lakes Dam No. 1

Dear Mr. O'Neill:

The following is my observation of the above captioned dam. No drilling was performed.

The back slope of the dam is experiencing severe surface erosion. This appears to be because the back slope was constructed with a sandy soil with very little cohesive material and probably loosely compacted. The eroded areas will have to be repaired and reseeded.

There is also a problem of underseepage. At the time of construction, an impervious clay core was installed. The core appears to be working satisfactorily. Even in the most severely eroded areas, there is no sign of seepage flow exiting in the backslope. However, there are some spring like areas at the base of the toe and a good bit of the area immediately below the toe is damp, even after this long dry spell. It would appear that the top flow line is under the core then approximately along the base of the dam.

Mr. Browning would like to install a filter system of clean, washed gravel, a 6" bituminous coated, perforated CM pipe. The approximate location would be as shown on the accompanying sketch. However, the actual location would be determined by field observation.

Thank you.

Note: Trench to be lined with polyfelt T. S. 200 filter cloth.

Sincerely yours,

Walter L. Anderson

TENNESSEE DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES
Suite 402-A, Box 42
225 Madison Avenue
Jackson, Tennessee 38301
901/424-3051

July 29, 1980

Mr. John Browning
Grand Valley Lakes Incorporated
167 Tillman
Memphis, TN 38111

Dear Mr. Browning:

This letter will document our conversation of July 29, 1980, concerning repairs on the main dam at Grand Valley Lakes.

It has been our agreement with all parties concerned, including you, that all work (including reconstruction of the [illegible] drain and installation of the toe drain) be done under the direct supervision of Walter Anderson, P.E.

Concerning your desire to delete the toe drain from the repair work, we find no engineering justification for such action. Mr. Anderson has submitted engineering specifications and a letter detailing his opinion of what needs to be done. Should this work be supervised by anyone else or changed in any manner, we would require more extensive laboratory work and documentation.

Sincerely,

Edmond S. O'Neill
Chief Engineer

esoneill

cc: Walter Anderson

TENNESSEE DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES
Suite 402-A, Box 42
225 Madison Avenue
Jackson, Tennessee 38301
901/424-3051

M E M O R A N D U M

TO: Files

FROM: David Roe

DATE: April 30, 1981

Information on Grand Valley Lakes' Dams design is unavailable except for spillway design. Conversations with Walter Anderson P.E., James H. Ragon, and Harry Bishop in Bolivar, and Wilder Hudson in the area SCS office in Jackson, indicated that there were probably no design plans for Grand Valley Lakes' Dams other than spillway designs.

Walter Anderson and James H. Ragon indicated that they had become involved in the project after construction of the dams had begun. Walter Anderson stated that he did not do any design work and James H. Ragon said that he had designed the spillways and plans are available.

Harry Bishop said that he had done the survey work for the project but did not know if design plans were available.

Wilder Hudson stated that the area SCS office had not done any design work for Grand Valley Lakes' Dams but had inspected the proposed site and informed developers of proper procedure for construction. He also informed that Frady Construction Company of Brownsville, the owner of which is deceased, had done the construction.

Plans available (spillway design only) have been obtained from James H. Ragon and are included.

DR:lt

ORNED-G

NON-FEDERAL DAM INSPECTION REVIEW BOARD
PO BOX 1070
NASHVILLE, TENNESSEE 37202

Commander, Nashville District
US Army, Corps of Engineers
PO Box 1070
Nashville, TN 37202

1. The Interagency Review Board, appointed by the Commander on 19 June 1981, presents the following recommendations after meeting on 16 July 1981, to consider the Phase I investigation report on Grand Valley Dam No. 1 performed by Winsett-Simmonds, Consterdine & Associates, Inc., under contract to the Tennessee Department of Conservation.

2. Section 3.1.5 should be expanded to include a discussion of the transient nature of the mobile homes and how many people could usually be expected to be in the flood path.

3. The location of the 42 inch pipe should be shown on the profile drawing.

4. The Board is in agreement with other report conclusions and recommendations following minor revisions.

FRANK B. COUCH, JR.
Chief, Geotechnical Branch
Chairman

BOBBY G. MOORE
Assistant State Conservation Engineer
Alternate, Soil Conservation Service

EDMOND B. O'NEILL
Alternate, Division of Water Resources
State of Tennessee

THOMAS N. PORTER
Hydraulic Engineer
Alternate, Hydrology and Hydraulics Branch

EDWARD B. BOYD
Hydrologic Technician
Alternate, US Geological Survey

BRADLEY B. HOOT
Chief, Structural Section
Alternate, Design Branch

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1070
NASHVILLE, TENNESSEE 37202

5 AUG 1981

IN REPLY REFER TO
ORNED-G

Honorable Lamar Alexander
Governor of Tennessee
Nashville, TN 37219

Dear Governor Alexander:

Please be informed of the results of an inspection, under authority of Public Law 92-367, conducted on Grand Valley Dam No. 1 in Hardeman County, Tennessee. An inspection team, composed of personnel from Winnsett-Simmonds, Consterdine and Associates, Inc., and a member of your Division of Water Resources, observed conditions which indicate a high potential for failure of the embankment dam due to seriously inadequate spillway capacity and other serious deficiencies.

Grand Valley Dam No. 1 is classified as a high hazard potential, intermediate size dam and, as such, should be able to regulate at least a full probable maximum flood (PMF) to conform to inspection program guidelines. A hydraulic analysis of the project's spillway showed the dam would be substantially overtopped by a full probable maximum flood. A visual inspection indicated that stability of the embankment is questionable due to seepage and erosion problems on the downstream slope and slides on part of the embankment.

Based on the results of the visual inspection and due to the seriously inadequate spillway capacity, the dam is considered unsafe. While I do not view this as an emergency at this time, I recommend you initiate prompt action by the State to cause the owner to correct the deficiencies as soon as practical to minimize the risk to the mobile home subdivision located downstream.

A report of the technical investigation will be furnished your office upon completion.

Sincerely,

LEE W. TUCKER
Colonel, Corps of Engineers
Commander

CF:
Mr. Robert A. Hunt, Director
Division of Water Resources
4721 Trousdale Drive
Nashville, TN 37220

AD-A108 473 TENNESSEE STATE DEPT OF CONSERVATION NASHVILLE DIV O--ETC F/G 13/13
NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS, TENNESSEE, --ETC(U)
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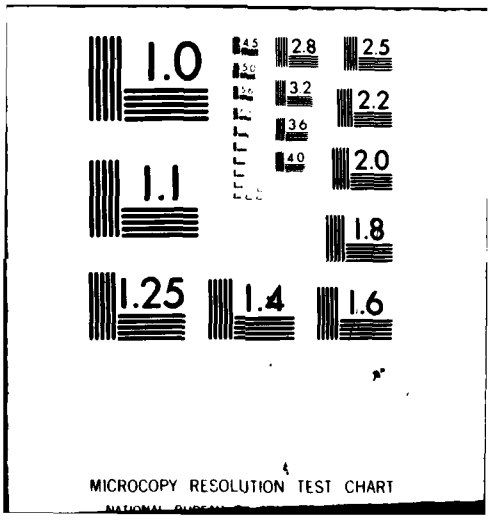
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APPENDIX G

HAZARD POTENTIAL

AND

CONDITION CLASSIFICATION DEFINITIONS

DEPARTMENT OF THE ARMY

OFFICE OF THE CHIEF OF ENGINEERS

HAZARD POTENTIAL CLASSIFICATION*

Category	Loss of Life	Economic Loss
Low	None expected (No permanent structures for human habitation)	Minimal (Undeveloped to occasional structures or agriculture)
Significant	Few (No urban developments and no more than a small number of inhabitable structures)	Appreciable (Notable agriculture, industry or structures)
High	More than few	Excessive (Extensive community, industry or agriculture)

*U.S. Army Corps of Engineers, Recommended Guidelines for Safety Inspection of Dams.

TENNESSEE DEPARTMENT OF CONSERVATION

DIVISION OF WATER RESOURCES

DAMAGE POTENTIAL CATEGORY*

Category	Description
1.	Dams located where failure would probably result in any of the following: loss of human life; excessive economic loss due to damage of downstream properties; excessive economic loss, public damage to roads or any public or private utilities.
2.	Dams located in predominantly rural or agricultural areas where failure may damage downstream private or public property but such damage would be relatively minor and within the general financial capabilities of the dam owner. Public hazard or inconvenience due to loss of roads or any public or private utilities would be minor and of short duration. Chances of loss of human life would be possible but remote.
3.	Dams located in rural or agricultural areas where failure may damage farm buildings or agricultural land but such damage would be more or less confined to the dam owner's property. No loss of human life would be expected.

* Tennessee Department of Conservation, Division of Water Resources, Rules and Regulations Applied to the Safe Dams Act of 1973. Chapter 0400-4-1.

DEFINITION OF CONDITION CLASSIFICATION

"Unsafe - Emergency" - A dam in a state of imminent failure. State and local authorities and downstream residents should be advised immediately, reservoir drained, or combination of the above (e.g., advanced piping, major slope instability, recent sudden collapse of a portion of the foundation, imminent overtopping, etc.).

"Unsafe - Nonemergency" - A dam with obviously serious deficiencies which clearly could develop, or are developing, into failure modes but do not yet pose the threat of imminent failure. State and local authorities should be advised promptly and remedial work should begin as soon as practical. Someone should be assigned to periodically check on the dam's condition until remedial work is begun. Drawing down the reservoir should be considered, e.g., flowing seepage from embankment which could lead to piping, evidence of solution channels or cavitation in the foundation, seriously inadequate spillway capacity as per ETL 1110-2-234, history of recurring slope instability, etc.).

"Significantly Deficient" - A dam with deficiencies which, if left unchecked, would likely become serious deficiencies and could ultimately result in failure. Advise State authorities and recommend remedial work be scheduled in time to prevent substantial further deterioration of the condition(s)--usually within six months to a year or sooner (e.g., heavy growth of sizeable trees on slopes, potentially serious erosion, spillway discharge channel too close to embankment, etc.).

"Deficient" - A dam with deficiencies which need attention but which would not likely effect the safety of the dam unless left unchecked for a long period of time. Advise State authorities and recommend remedial action at owner's convenience but before the problem can escalate into a significant deficiency (e.g., brush and/or few or very small trees on embankment, long term deterioration of masonry or metal outlet features, formation of deep ruts in embankment roadway, deterioration of riprap, etc.).

"Not Deficient" - Well constructed and maintained dam with no apparent deficiencies relative to its safety and structural integrity.